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**Wisconsin Public Service Corporation**  
(a subsidiary of WPS Resources Corporation)  
700 North Adams Street  
P.O. Box 19001  
Green Bay, WI 54307-9001

January 29, 2001

Public Service Commission of Wisconsin  
James D. Looch  
Chief Engineer – Electric Division  
610 N. Whitney Way  
P.O. Box 7854  
Madison, WI 53707-7854

Re: PSC 113.0607

Dear Mr. Looch:

Enclosed in triplicate is Wisconsin Public Service Corporation's report prepared in compliance with PSC 113.0607 - Appropriate Inspection and Maintenance: System Reliability.

Sincerely,

Lawrence T. Borgard  
Vice President –  
Transmission and Engineering

David W. Harpole  
Assistant Vice President -  
Energy Supply

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Electric Division

Public Service

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Wisconsin Public Service Corporation

(a subsidiary of WPS Resources Corporation)

600 North Adams Street

P.O. Box 19002

Green Bay, WI 54307-9002

January 31, 2001

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Electric Division

Ms. Lynda L. Dorr  
Secretary to the Commission of Wisconsin  
610 North Whitney Way  
P. O. Box 7854  
Madison, WI 53707-7854

PSCW Rule 113.0607 Appropriate Inspection and Maintenance System Reliability for  
Kewaunee Nuclear Power Plant

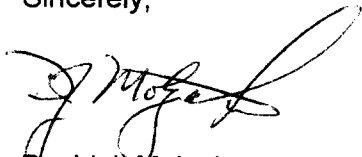
Dear Ms. Dorr:

Enclosed is the Kewaunee Nuclear Power Plant (KNPP) Preventative Maintenance Plan as required by PSC Rule 113.0607. This plan outlines and describes the performed inspections and planned maintenance activities for the plant. Due to the number of procedures, this plan does not provide all the detailed procedures and programs required to be performed by plant technical specifications, NRC regulation, insurance requirements or other commitments. Should there be a need to review the detailed procedures and programs, they will always be available at the plant for your review.

In addition to this information, the Kewaunee Plant will be shutting down during September 2001 for a refueling outage. Recall that the KNPP is on an 18-month refueling cycle. During this outage, the major priority for the plant staff will be replacing the steam generators. In addition, thousands of maintenance tasks will be performed on the plant's safety related equipment and equipment important to safety. The non-safety related equipment will be maintained in accordance with normal routine outage maintenance. Finally, a low pressure turbine rotor will be changed out with a spare rotor and an exciter/electrical generator inspection (crawl through) will also be performed.

Should you need any additional information, please feel free to call me at 920-433-1308.

Sincerely,



David J. Molzahn  
Director - Nuclear Oversight

Enclosure

cc: John Palmer KNPP  
Doug Johnson NMC Hudson

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**Wisconsin Public Service Corporation**  
***Preventative Maintenance Plan***

**Kewaunee Nuclear Power Plant**

**January 31, 2001**

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**Electric Division**

**Prepare By:**

John A. Palmer

# **PREVENTIVE MAINTENANCE PLAN**

## **GENERATION FACILITIES**

### **Scope**

The purpose of this Preventive Maintenance Plan is to outline and describe the inspections performed and maintenance activities planned for the Company's Kewaunee Nuclear Power Plant and is factored into determining the necessity for equipment replacements or repairs. This plan satisfies the requirements of Wisconsin Administrative Code – Electric Service Rules, specifically, PSC Rule 113.0607, Appropriate Inspection and Maintenance: System Reliability.

As practiced at Kewaunee Nuclear Power Plant, preventive maintenance is composed of a number of elements and activities that are designed to achieve a high level of reliability when the generating unit is required to be operable. These elements and activities involve scheduled operator observations, planned inspections, condition monitoring, surveillance testing, as well as the use of predictive maintenance technologies and planned maintenance tasks labeled preventive maintenance. These tasks are under a continuous assessment of implementation in order to achieve a high level of plant unit reliability.

### **Applicability**

In accordance with the Wisconsin PSC Rule 113.0607 requirements for utility generator's of 50 MWs or more, this preventive maintenance plan applies to the Kewaunee Nuclear Power Plant.

### **Responsibilities**

The Assistant Plant Manager – Maintenance is responsible for implementation of this preventive maintenance plan and for ensuring the correction of deficiencies found during the preventive maintenance tasks.

### **Preventive Maintenance**

Time based maintenance tasks performed based on the component/system importance to plant safety and power production and considering the system's component equipment operational usage, the local environment, equipment performance history and equipment supplier input. Preventive maintenance tasks include oil changes, lubrications, instrument calibrations, filter changes, monitoring of equipment parts expected to wear and "hours" in use or "meter-based" inspections/replacements of normally expected worn/diminished components. Task performance frequency is dependent on the particular system, the particular equipment and the particular task.

## **PREVENTIVE MAINTENANCE PLAN**

### **GENERATION FACILITIES**

The Preventive Maintenance Program is adjusted based on the station's Preventive Maintenance Optimization (PMO) Program. The PM Optimization Process has its roots in Reliability Centered Maintenance. It is a methodology systemized for optimization of an existing PM program. PM Optimization emphasizes the maintenance of system/component functions and considers the inherent reliability of individual components. A structured decision logic is used to select the most appropriate PM task for each critical component failure. History, failures, staff interviews, predictive maintenance results, trendable measures, and commitments are used to evaluate and provide a documented basis for benchmarking the frequency of performance. The living program, consisting of a dynamic interface with Planning and Scheduling, along with performance feedback and work order history, will provide for re-evaluations that will optimize tasks and frequencies, providing the most effective priority-based preventive maintenance, with consideration of safety and economics.

### **Predictive Maintenance**

Many predictive maintenance technologies have proven useful to assist in accurately assessing equipment condition. These fundamental key technologies provide information needed to assess equipment condition and, therefore, form the basis for this sites predictive maintenance program. Additional technologies available such as, Motor Power Monitoring (MPM), ultrasonics, nondestructive inspection techniques and plant computer points (temperature, pressure, etc.) are used to supplement the key technologies to detect failure mechanisms not readily detectable by the key methods. The key technologies include but are not limited to the following:

**Vibration Monitoring and Diagnostics** - techniques used typically for the monitoring and analysis of plant rotating equipment -- This technology analyzes and trends displacement, velocity, and acceleration vibration patterns to predict the need to correct problems in rotating equipment such as degraded bearings, improper alignments, and out-of-balance or worn components prior to equipment failure. It has also proven useful in assessing system piping and building structures through operational deflection shapes and modal analysis.

**Lubrication Analysis** - techniques used to detect lubricant breakdown and abnormal equipment internal wear. Lubricating oil analyses monitor the physical properties of the oil. Some properties measured include viscosity, moisture content, acidity, and the presence of additives or contaminants such as engine fuel or dirt. Grease analyses detect changes in the lubrication properties of grease. Sensory tests such as color, odor, and consistency are most often applied to greases, in addition to laboratory testing.

## **PREVENTIVE MAINTENANCE PLAN**

### **GENERATION FACILITIES**

**Infrared Thermography Imaging** - a technique based on measuring and comparing infrared radiation emitted from various equipment surfaces -- Infrared surveys can be performed on heat-producing equipment such as motors, circuit breakers, electrical distribution panels, batteries, electrical connections, thermal insulation, or rotating equipment couplings. Infrared thermography can also aid in determining condenser in-leakage locations, tank levels, internal valve leaks, and rotating equipment alignment problems.

**Operating Equipment Observation** - a technique that does not require sophisticated data-gathering techniques or expensive test equipment but instead uses readily available equipment operating parameters and observation of equipment operation – Adverse trends in equipment operating parameters during steady-state operations or unexpected parameter changes that occur during transient conditions may indicate the need to perform more sophisticated predictive maintenance. Obvious unusual noises or smells around operating equipment may also indicate equipment problems requiring follow-up.

The extent of component degradation indicated by predictive maintenance activities is evaluated and integrated as appropriate into the corrective and preventive maintenance program. The maintenance work management process is used to plan and schedule activities to effectively and efficiently complete predictive maintenance activities.

### **Inspections**

**In-Service** – Inspections performed on equipment or unit systems to determine current condition relative to design intent. These tasks are performed utilizing test methods and frequencies specified by the following:

- ASME Boiler and Pressure Vessel Code Section XI 1989 Edition “Rules for Inservice Inspection of Nuclear Power Plant Components” for Class 1, 2 and 3.
- ASME Boiler and Pressure Vessel Code Section XI 1992 Edition with 1992 Addenda “Rules for Inservice Inspection of Nuclear Power Plant Components” for Class MC.

### **Testing**

**In-Service** – Periodic testing of pumps and valves in accordance with the requirements of ASME Boiler and Pressure Vessel Code, Section XI, 1989 edition and Operations and Maintenance of Nuclear Power Plants, ASME/ANSI-1987 with OMa 1988 addenda.

## **PREVENTIVE MAINTENANCE PLAN**

### **GENERATION FACILITIES**

**Surveillance** – Testing, inspection or observation to verify that structures, systems and components/equipment continue to function or be in a state of readiness to perform functions. The surveillance program is designed to meet the requirements of the station's Technical Specifications.

The above forms of preventive maintenance are used to maintain equipment operability and to identify equipment conditions requiring corrective maintenance. In addition, the above forms of preventive maintenance can result in equipment upgrades, application of new equipment technologies and changes to operating practices.

#### **Equipment Performance Monitoring**

Equipment/system performance is monitored, trended and evaluated in accordance with the requirements of Code of Federal Regulations 10CFR 50.65 "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants".

#### **Corrective Actions**

The results of the inspection, preventive maintenance or test activities provide input to the maintenance of the facility. In general, maintenance is performed in a reasonable period where required to achieve operational safety, environmental compliance and to achieve unit reliability for production. Scheduling and processing of station corrective maintenance is controlled by station directives.

#### **Records**

Records related to the preventive, predictive and corrective maintenance programs are maintained and retained in accordance with the station's Operational Quality Assurance Program and Technical Specifications.

#### **Reports**

An annual report for the previous calendar year will be submitted to the PSC. The submittal will be on or before May 1 of each year. The report will provide notice of compliance to the preventive maintenance plan and exceptions or changes made to the plan.





# **Wisconsin Public Service Corporation**

## ***Preventative Maintenance Plan***

**Generating Facilities  
Distribution  
Substation**

**January 15, 2001**

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**Wisconsin Public Service Corporation  
Preventative Maintenance Plan –  
Generating Facilities**

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**PSC 113.0607**  
**PREVENTATIVE MAINTENANCE PLAN**

**I. INTRODUCTION**

The purpose of this Preventative Maintenance Plan is to satisfy the requirements of Wis. Adm. Code Chapter PSC 113, Service Rules for Electrical Utilities, Subchapter VI – Safety and Service Standards, Section 0607 Appropriate Inspection and Maintenance: System Reliability. The contents of this plan describe the preventative maintenance, predictive maintenance, corrective maintenance, condition monitoring, functional testing, equipment overhauls, and inspection programs implemented at Wisconsin Public Service (Public Service) generating stations. These programs are based on Original Equipment Manufacturer (OEM) recommendations, operating experience, and regulatory compliance requirements.

**II. PERFORMANCE STANDARD**

The Public Service Generating Facilities Preventative Maintenance (PM) Plan is designed to ensure the production of high-quality and reliable electricity while ensuring safety, environmental stewardship, and value. Public Service adheres to “Good Utility Practice” which includes designs, practices, methods and equipment, that are commonly used, engaged in or approved by prudent electric generation companies to design, construct, install, operate and maintain their electric generating, transmission and distribution equipment lawfully and with safety, dependability, efficiency and economy; and that are in accordance with any applicable laws in effect as of the date hereof, and as such may be changed from time to time. Good utility practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather includes all acceptable practices, methods, or acts generally accepted in the region. Although specific PM Tasks vary slightly from plant to plant, Public Service adheres to similar performance standards for each generating station.

### III. SCOPE OF PREVENTATIVE MAINTENANCE PLAN

The generating stations listed in the following table are fully or partially owned and operated by Public Service and are included in this PM Plan. Joint owner generating stations which are not operated by Public Service and those stations of which Public Service is a minority owner are not included in this PM Plan. Generating units, including hydroelectric, coal fired, natural gas fired and fuel oil fired, with a capacity less than 50 MW are not included in this plan.

#### Public Service Generating Stations

Plant	Unit	Commercial Date	Fuel	TECHNOLOGY TYPE	Nameplate Rating (MW)
J. P. Pulliam Bylsby Ave. Green Bay, WI	5	1949	Coal	Pulverized coal, wall fired, non-reheat, condensing	50
	6	1951	Coal	Same as Unit 5	62.5
	7	1958	Coal	Pulverized coal, wall fired, reheat, condensing	75
	8	1964	Coal	Same as Unit 7	125
Weston 2501 Morrison Ave. Rothschild, WI	1	1954	Coal	Pulverized coal, wall fired, non-reheat, condensing	60
	2	1960	Coal	Pulverized coal, wall fired, reheat, condensing	75
	3	1981	Coal	Pulverized coal, corner fired, reheat, condensing	321.6
	32	1973	Natural Gas/Fuel Oil	Combustion Turbine	51
West Marinette W1830 W. Cleveland Ave. Marinette, WI 68% Public Service Owned	33	1993	Natural Gas/Fuel Oil	Combustion Turbine	87.4

#### **IV. INSPECTION AND MONITORING PROGRAMS**

This section of the Public Service PM Plan lists significant inspection, condition monitoring, predictive maintenance, preventative maintenance, and corrective maintenance programs used to ensure safety and equipment reliability. The description of each program includes the scope of each program, how inspection frequency is determined, and how the results of these programs are dispositioned, prioritized, tracked and trended. Programs implemented at a plant typically apply to all units at each plant.

##### **Boiler Outages**

Pulliam & Weston

Planned boiler outages are typically scheduled on a 12 to 18 month interval. The outage length is dictated by critical path scheduling and are normally two to three weeks in duration. During boiler outages visual inspections of plant equipment are performed by knowledgeable persons. Equipment such as pulverizers, feeders, exhausters, primary air fans, pumps, boiler internals, precipitators, windboxes, ductwork, burners, dampers, air heaters, dearators, boiler bottoms, ash hoppers, and electrical breakers are opened for inspection and repair. Other balance of plant equipment is inspected and repaired as necessary. The boiler is also typically inspected by a qualified third party inspector during each outage. The scope of the third party inspection includes the fire side, water side, refractory, ductwork, air heaters, burners, etc. In addition to the third party inspection, the boiler is also inspected by a Hartford Steam Boiler (HSB) inspector. Repairs recommended by the third party and HSB inspectors are evaluated and performed based on feasibility and criticality.

Ultrasonic Examination is performed on various tube sections of the boiler to identify wear patterns caused by sootblowers and or fly ash erosion. Water wall tube samples are taken during boiler outages. The weight density and composition of deposits on the internal surface of the tubes are analyzed. The results of the analysis are used to determine the need for chemical cleaning. Throughout the operational cycle, tube leaks are monitored and trended. Problematic areas of boiler operation are identified, studied, and corrected. These problems include boiler tube leaks, fire side tube pluggage, and air heater pluggage. Repairs, design and/or operational changes are evaluated to correct recurring problems. Preventative maintenance along with both planned and unplanned corrective maintenance is performed as necessary.

To assure optimum performance, the pulverizers on all coal fired units are inspected on a periodic basis for wear, clearances, spring tension, lube oil quality, and grinding capabilities.

##### **Turbine Overhauls**

Pulliam & Weston

Turbine overhauls are scheduled approximately every four to six years. The typical duration of turbine outages is five to eight weeks. During turbine overhauls, the turbine is disassembled and inspected by plant personnel with technical direction from qualified third party representatives.

Nondestructive Examination is performed on bearings, nozzles, blading, diaphragms, couplings, bolting, casings, flanges, valve bodies, valve seats, and valve discs. Detailed clearance checks are made and compared to OEM recommendations. OEM recommendations along with a review of previous outage reports provide the basis for defining the scope of work performed. Preventative maintenance along with both planned and unplanned corrective maintenance is performed as necessary. The following inspection and maintenance tasks are typically performed:

Seal clearances are checked

Bearing babbitt and bonding are inspected

Spindle forgings are inspected including a bore exam approximately every 10 – 15 years or as dictated by the previous inspection results

Overspeed and vacuum trips are checked

Main steam, reheat intercept, and stop valves are exercised

Turbine components are sandblasted and examined using nondestructive testing

Check valves in the extraction steam lines are examined

Generators are typically disassembled and inspected during turbine overhauls. OEM inspections performed include, but are not limited to, bearings, couplings, retaining rings, rotor windings, stator windings, electrical bushings, and grounding devices. Rotor boresonic examinations are performed based on previous testing and OEM recommendations.

#### West Marinette – M33 & Weston – W32

The PM Plan for M33 & W32 was developed using recommendations from the OEM Operation and Maintenance Manual and operator experience. PM activities for M33 & W32 including scheduling, maintenance, and record keeping are administered from the West Marinette and Weston sites, respectively. Visual inspections along with review of operating data are regularly performed to ensure safe, efficient, and reliable operation of the units. Auxiliary and control systems preventative maintenance is performed as recommended by the OEM. An annual inspection of the site is performed by a representative of our insurance carrier. An inventory of spare parts is maintained at the sites to minimize down-time.

Three significant types of shutdown inspections are performed on M33 & W32. These inspections include “Combustion”, “Hot Gas Path”, and “Major” inspections. The Combustion inspection includes inspecting the fuel nozzles, the combustion liners transition pieces and crossfire tubes. The Hot Gas Path inspection includes the Combustion Inspection and, in addition, a detailed inspection of the turbine nozzles and buckets. The Major Inspection includes inspection of all the major “flange-to-flange” components of the gas turbine which are subject to wear during normal turbine operation. This inspection includes elements of the Combustion and Hot Gas Path inspections.

Inspection intervals are based on OEM recommendations, utilization of equipment, ambient operating conditions, type of fuel burned, hours operated, starting frequency, load cycle, and experience accumulated during its operation.

### Vibration Monitoring

#### Pulliam & Weston

Vibration monitoring is performed on all major rotating equipment including, fans, pulverizers, turbines, generators, pumps, air compressors, etc. Real-time vibration readings are taken on turbine bearings and other critical equipment. Data is collected by technicians in the plant, downloaded, analyzed and trended. Readings are taken at the same locations on the equipment included in this program to ensure consistent data is recorded. Alarm/alert levels are based on OEM recommendations and operating experience of plant personnel. The frequency of this testing varies from monthly to every six months, depending on the criticality of the equipment.

If overall levels exceed a predetermined alarm value or if abnormal reading are observed, the equipment is further analyzed to determine the possible cause and whether corrective measures need to be taken. Vibration analysis is also used to characterize potential problems on equipment exhibiting symptoms of potential failure such as, unusual noise, excessive maintenance, degraded performance, etc. Preventative or corrective maintenance is performed as necessary.

#### West Marinette – M33 & Weston W32

The M33 & W32 generating units are supplied with factory installed vibration monitoring devices. Vibration levels exceeding limits generate an alarm that is received by the operator. Manual vibration readings on major equipment and motors are taken as needed to supplement factory installed vibration monitoring. If readings exceed a predetermined alarm value or if abnormal reading are observed, the equipment is further analyzed to determine the possible cause and to determine whether corrective measures need to be taken.

### Thermography

#### Pulliam & Weston

Thermography is performed on all major rotating equipment, boiler walls, breakers, switchgear, and generator disconnects. Thermography inspections at Pulliam are typically performed on a quarterly basis and prior to scheduled outages as necessary. Thermography at Weston is typically performed on a yearly basis. The results of this testing are used to identify potential equipment problems and provide input to outage work plans. Problem areas are addressed based on criticality and availability of parts. A follow up scan is typically scheduled to verify the problem was properly diagnosed and corrected.

### Oil Analysis

#### Pulliam & Weston

Oil analysis is performed on motors, gear reducers, conveyers, fluid drives, critical pumps, pulverizers, and the turbine/generator oil system. The frequency of this testing at Pulliam varies from monthly to annually. Testing of oil from various components is performed prior to



scheduled outages to identify maintenance requirements. Oil analysis at the Weston plant is typically completed quarterly. The oil sampling process is initiated by a computerized maintenance management system (CMMS) for each piece of equipment. The samples are sent to a lab that trends the results of the samples. A report is sent with the oil analysis results. The report shows the results from the last five oil samples. If a parameter is out of control, it is identified on the report with a description of the problem and what type of corrective action should be taken. A corrective maintenance work order is issued to address the problem and a follow up oil sample is taken if necessary.

The lab analyzes the oil samples for particle count (cleanliness), wear metals, contaminant elements, additive elements, physical properties, and water. If problems show up in the basic oil analysis that can not be identified; additional oil test, vibration monitoring, and thermography may be performed to determine the cause of the problem. The results of the oil analysis are used as a basis for oil change frequency.

#### West Marinette – M33 & Weston W32

Oil analysis is performed on the lubrication and hydraulic systems. The frequency of sampling varies from quarterly to annually. The samples are sent to a lab for analysis. The lab analyzes the oil sample for particle count (cleanliness), wear metals, contaminant elements, additive elements, physical properties, and water. A report is returned with the oil analysis results. If a parameter is out of control, it is identified on the report with a description of the problem and what type of corrective action should be taken. A corrective maintenance work order is issued to address the problem and a follow up oil sample is taken if necessary.

#### Motor Testing

##### Pulliam & Weston

Megger, surge, and DC Hi-pot testing are performed on motors contributing to generation. Motor reliability is assured by performing vibration checks, planned maintenance on the lubrication systems, rotor bar checks, and visual inspections of the motor. The vibration and rotor bar checks are performed using specialized equipment and a data logger, and the results are downloaded into the plant LAN computer system. The motor PM interval is based on the criticality of the motor and corrective maintenance history. At Pulliam, this testing is typically performed during each scheduled maintenance outage. At Weston, the interval varies from monthly to years. Results are compared to specified acceptance criteria and deficiencies are corrected as necessary.

### Instrument & Control

Pulliam & Weston

A CMMS is used to schedule the PM's performed on all the instrumentation calibrated, inspected and serviced, including (temperature, pressure, and flow transmitters, pressure switches, level switches, valve and damper positioners/feedback transmitters, environmental analyzers, water analysis equipment, vibration monitoring and other various instruments).

All the equipment serviced has equipment numbers assigned and are a part of the CMMS. All equipment history is stored in the CMMS and is available for easy retrieval. The results of the calibration checks are recorded on calibration data sheets or calibration control charts. The frequency of PM's are determined by various means depending on equipment usage, manufactures recommendations, insurance company and regulatory agency requirements, criticality and corrective maintenance history. The testing frequencies vary from monthly to five years.

West Marinette – M33 & Weston W32

Instrumentation and controls are calibrated, inspected, and serviced as recommended by the OEM Operation and Maintenance Manual and operator experience. Results are recorded and monitored.

### Operator, Maintenance Rounds

Pulliam & Weston

Operators are given extensive training on identification of system and equipment problems. Operator rounds are performed on a regular basis and provide constant monitoring of the main support systems and sub-systems through local and remote monitoring instruments. Operator rounds provide frequent visual observation of plant equipment which includes an informal assessment of the operability of plant equipment. During these rounds personnel check fluid levels, perform alarm testing, look for leakage, degradation of equipment, operating parameters outside of expected ranges, safety hazards, etc. Deficiencies identified are reported and corrected as necessary.

Operators test off line equipment for readiness on a weekly basis. These tests typically include valves, pumps, safety equipment, etc. Planned routine maintenance is also performed on the equipment during these checks to assure its availability. Equipment operating hours are monitored and used in the development of maintenance schedules. Statistical process control is performed to provide predictability of failing processes. Different seasonal operating conditions are met by aligning the systems according to the season they will be operating in.

### West Marinette – M33 & Weston W32

Operator rounds are performed on a regular basis during periods of both operation and non-operation. Visual inspections are performed looking for leaks, hazards, abnormalities, unusual sounds, odors, abnormal indicator readings, etc. The occurrence of non-routine events are documented in a log maintained at the site. If deficiencies are identified, a work request is generated and corrective or preventative maintenance is performed as necessary.

#### Chemistry

##### Pulliam & Weston

Monitoring and control of boiler cycle water chemistry is a vital means of significantly reducing cycle related corrosion failures and improving unit availability. In 1986 The Electric Power Research Institute (EPRI) published the “Interim Consensus Guidelines for Fossil Plant Cycle Chemistry” (CS-4629) to provide chemistry guidance to operators of fossil fuel boilers. The guidelines provide operating chemistry limits based on both domestic and international industrial operating experience, and the thermodynamic properties of water and steam. Operating experience has demonstrated that these guidelines provide optimum control of boiler and turbine corrosion and deposition, which translates into improved unit reliability.

Public Service operates boiler cycle systems in accordance with EPRI chemistry guidelines. Boiler water chemical parameters are monitored continuously using on-line instrumentation. The on-line instruments send a signal to the boilers distributed control system, which gives the operators a continuous direct readout of chemistry parameters. When chemistry parameters go outside of the desired range, an alarm signal is generated and the operator takes corrective action, or contacts lab personnel. The lab personnel are full time personnel dedicated to the maintenance of the boiler cycle chemistry. Through analysis of water samples and maintenance of on-line instrumentation, lab personnel monitor and maintain the chemistry of the makeup water, condensate, deaerator, boiler, steam, and cooling water systems to ensure optimum operation and unit reliability.

#### High Energy Pipe Inspections (HEP)/Nondestructive Testing

##### Pulliam & Weston

Inspections are performed on high energy piping systems to assure the safety of personnel and reliability of the generating unit. The systems included in the HEP inspection program are the main steam, hot reheat, cold reheat, and the feedwater piping.

A portion of the piping system is inspected during major outages so as to spread the budget money needed over a period of time. The sections of piping to be inspected are selected based on pipe stress analysis, geometry, and results of previous inspections. The results of the HEP Inspections are filed in the Fossil and Hydro Operations Department and with the unit outage report. There is no standard inspection interval set for each line. The intervals are determined based on the results of each

inspection. The inspection schedules and planning are performed by Fossil and Hydro Operations engineers and performed by Nondestructive Examination (NDE) contract laborers.

The inspection methods used are dependent on the piping system being inspected. Feedwater lines are inspected for flow accelerated corrosion using UT recordings of the wall thickness at various locations. The locations are selected based on geometry with different locations chosen at each outage. Feedwater lines and steam lines are inspected for indications of cracks at girth welds and hanger attachments. Periodically, high stress areas of steam lines are NDE inspected for creep by taking surface replications. Seam welded piping (only one such line exists on Public Service units) is inspected for creep cavitation and micro cracking along the entire longitudinal weld using a variety of procedures in accordance with EPRI seam welded piping inspection guidelines.

When it is deemed necessary to model a piping system to determine high stress areas, or to evaluate modifications to the line, “CAEPIPE™” modeling software is used. Piping models are created and maintained by the Project and Facilities Services department.

In addition to inspections performed on piping, 30% of the de-aerator tank welds are inspected annually and 100% of the tray section is inspected approximately every five years.

#### Safety Valve Testing Program

Pulliam & Weston

The safety valves of registered pressure vessels are tested in accordance with the Safety Valve Testing Program. The test program includes periodic testing with an assist lift device as well as periodic bench testing. A qualified vendor performs inspections and testing. The Safety Valve Test Program is written to be in compliance with the Wisconsin Administrative Code and insurance carrier requirements.

Repairs to safety valves are made as necessary by a vendor qualified to perform safety valve repair work.

#### Boiler Repairer Program

Pulliam & Weston

The Weld Repair Quality Control Program applies to all weld repairs performed on all boilers and piping components associated with boilers and pressure vessels within the scope of the Wisconsin Administrative Code, Department of Commerce, Chapter Comm 41, Boilers and Pressure Vessels.

This program describes the methods utilized to repair a boiler or pressure vessel or their fittings, settings or appurtenances in compliance with the Wisconsin Administrative Code, Department of Commerce, Chapter Comm 41, Boilers and Pressure Vessels. All work including material selection, weld procedure qualification, and welder certification is performed in accordance with the applicable section of the construction code or the ASME Boiler & Pressure Vessel Code. The method and

extent of repairs are reviewed with, and accepted by, the Authorized Inspection Agency having jurisdiction prior to the commencement of any such repair.

### Corrective Maintenance System

#### Pulliam & Weston

Both Pulliam and Weston, including W32, utilize very similar corrective maintenance systems. Computerized maintenance management software (CMMS) is utilized to schedule and track corrective maintenance items. When corrective maintenance is required on a piece of equipment, a work request is generated. Work requests may be generated by all plant employees. Work requests are reviewed by the Shift Supervisor and upon approval become work orders. Work orders are prioritized based on a rating system. Each plant asset is assigned a criticality code (i.e. multiple unit outage, possible unit outage, unit outage, etc.) and an associated numeric value based on the affect on the plant if the asset is out-of-service. Each asset is also assigned a status code (i.e. running, will fail, failed, etc.) and an associated numeric value based on the status of the asset. A calculation is performed to determine the work order priority. High priority work orders are given preference over lower priority work.

#### West Marinette – M33

Automated Maintenance Management Software (AMMS) is used to create, schedule, track, and record corrective maintenance tasks. All work orders and work related documentation including work description, hours of work, date completed, and parts used are recorded in the AMMS. Work orders are prioritized based on engineering judgement and operator experience. High priority work orders are given preference over lower priority work.

## **V. REPORTING**

### Performance Statistics

Unit performance reports will be filed on or before May 1 of each year beginning in 2001. Performance reports will be provided for units with a capacity greater than 50 MW. Performance data including summer capacity, winter capacity, net dependable capacity, capacity factor, MWh of generation, heat rate, fuel consumed, forced outage rate, and scheduled outage rate will be submitted on the spreadsheet as indicated in Attachment A. (See Page 1-15)

### Capacity Testing

#### **Pulliam & Weston**

Winter and summer capacity tests are typically performed on all units every other year (summer capacity tests were performed 2000, the next winter capacity tests will be performed in 2001, etc.). The capacity test requires the units to be run up to a safe maximum operating load and held at this state for four (4) hours. These tests must be repeatable and obtainable within a one day notice. Coal and gas are used to achieve the maximum capacity.

Heat rate tests are performed after major unit overhauls, typically every four to five years. Boiler efficiency is calculated using the ASME heat loss method. Gross turbine heat rate is calculated using the turbine cycle boundaries. A heat rate curve is developed from five test points. These results are trended, analyzed, and compared to previous test.

All major operating equipment (Boiler feed pumps, misc. pumps, feed water heaters, pulverizers, etc.) is analyzed yearly or biyearly depending on criticality. Analysis of design and previously recorded data is used to evaluate the condition of equipment. Any indications of degraded performance is evaluated and addressed.

#### **West Marinette – M33 & Weston W32**

Winter and summer capacity tests are performed on all units every other year (summer capacity tests were performed 2000, the next winter capacity tests will be performed in 2001, etc.). The capacity test requires the units to be run up to a safe maximum operating load and held at this state for one hour. The results are also compared to previous tests to look for trends or out of control points.

## **VI. COMPLIANCE WITH THE PREVENTATIVE MAINTENANCE PLAN**

The Public Service Generating Facilities PM Plan is designed to ensure the production of quality and reliable electricity while ensuring safety, environmental stewardship, and value. In addition to the performance indicators that will be reported in Attachment A, numerous other performance indicators are internally monitored to ensure continued generating unit reliability. Public Service reports unit performance data that conforms to Generator Availability Data System requirements to the National Electric Reliability Council. The summation of the maintenance, inspection, and monitoring programs implemented by Public Service enable us to qualitatively monitor the condition of our generating facilities. Public Service generating units within the scope of this plan have demonstrated a high availability rate along with a low forced outage rate over the past several years. These results validate the effectiveness of Public Service's PM Program.

## **VII. RECORD KEEPING**

### **Pulliam & Weston**

CMMS is used to create, schedule, track, and record corrective maintenance and repetitive preventative maintenance tasks. The software contains the criticality logic that is used to prioritize corrective maintenance work. All work orders and work related documentation including work description, duration of work, date scheduled vs. date completed, and parts used are included in the CMMS. Inspection and repair records will be retained for the life of each plant.

### **West Marinette – M33**

Automated Maintenance Management Software (AMMS) is used to create, schedule, track, and record corrective maintenance and repetitive preventative maintenance tasks. All work orders and work related documentation including work description, hours of work, date scheduled vs. date completed, and parts used are included in the AMMS. Inspection and repair records will be retained for the life of each plant.

## **VIII. BUDGET PROCESS**

Budgets are prepared for a three year time frame (i.e. budgets for 2001, 2002, 2003 are prepared during the summer of 2000). Large individual expenditures and known annual activities are specifically identified in the budget. Funds are also budgeted for general repairs and maintenance based on the results of outage inspections, results of preventative and predictive maintenance programs, and historic expenditure levels.

Prior to planned outages, a workplan is prepared detailing the scope of work including man-hours needed and expected expenditures. If expenditures exceed the amount budgeted, the scope of work is reviewed and prioritized taking into consideration safety, production, potential increase in outages or derates, etc. If the scope of work cannot be reduced by reprioritizing or rescheduling, the work will be performed as required. To satisfy budget requirements, funds from other lower priority areas may be transferred or a budget overrun may occur.

## **IX. EXCHANGE OF PLANNED OUTAGE INFORMATION**

The requirement to exchange planned generator and high voltage transmission line outage information will be administered by the new American Transmission Company (ATCo) and the Mid-west Independent System Operator (MISO).

## **X. SUMMARY**

The purpose of this Preventative Maintenance Plan is to satisfy the requirements of Chapter PSC 113, Wis. Adm. Code – Service Rules for Electric Utilities, Subchapter VI, Section 0607 Appropriate Inspection and Maintenance: System Reliability. The Public Service Generating Facilities PM Plan is designed to ensure the production of quality and reliable electricity while ensuring safety, environmental stewardship, and value. Generating units, including hydroelectric, coal fired, natural gas fired and fuel oil fired, with a capacity less than 50 MW were not included in this plan. Periodic maintenance and performance data will not be reported for units with capacity < 50 MW. Public Service generating units within the scope of this plan have demonstrated a high availability rate along with a low forced outage rate over the past several years. These results validate the effectiveness of Public Service's Preventative Maintenance Program.



West - Preventative Maintenance Plan Chapter 1 Generating Facilities  
 Section: Attachment A (Related to Section V - Reporting)

Plant	Unit	Technology Type	Summer Capacity MW	Winter Capacity MW	Net Dependable Capacity MW	Generation MWh	Heat Rate Btu/MWh	Cap. Factor	Fuel Consumed	Forced Outage Rate	Sched. Outage Rate
Pulliam	5	Pulverized coal, wall fired, non-reheat, condensing									
	6	Same as Unit 5									
	7	Pulverized coal, wall fired, reheat, condensing									
	8	Same as Unit 7									
Weston	1	Pulverized coal, wall fired, non-reheat, condensing									
	2	Pulverized coal, wall fired, reheat, condensing									
	3	Pulverized coal, corner fired, reheat, condensing									
	32	Combustion turbine									
West Marinette	33	Combustion turbine									

**Wisconsin Public Service Corporation  
Preventative Maintenance Plan –  
Electric Distribution**

- I. INTRODUCTION**
- II. PREVENTATIVE REPAIR OF ELECTRIC PLANT (PREP)**
- III. UNDERGROUND SYSTEM INSPECTIONS (NEW AND EXISTING)**
- IV. POLE INSPECTIONS & TREATMENT**
- V. DISTRIBUTION LINE CLEARANCE PROGRAM**
- VI. DISTRIBUTION INFRARED SURVEYS**
- VII. ELECTRIC SERVICE CONDITION INSPECTIONS**
- VIII. MISCELLANEOUS DISTRIBUTION LINE INSPECTIONS**
- IX. TRANSMISSION LINE INSPECTIONS**
- X. SUMMARY**

Wisconsin Public Service Corporation (WPSC)  
Distribution Preventative Maintenance Plan (Disco - PMP)

## **I. INTRODUCTION**

The purpose of section II of the WPSC Disco - PMP is to satisfy the requirements of PSC 113.0607 *Appropriate inspection and maintenance: system reliability* as they pertain to the WPSC electrical distribution system. This section will describe each of the existing WPSC processes used to ensure a safe, reliable, cost effective electrical distribution system. The processes will be broken down into three separate categories: Inspection procedures, condition rating criteria and corrective action scheduling, and record keeping. In addition, supporting documentation for each of these processes, including standards, checklists, forms and statistics, will be provided.

## II. PREVENTATIVE REPAIR OF ELECTRIC PLANT (PREP)

### INSPECTION

Periodic inspection of the distribution system is covered in section 214.a.2 of the National Electric Safety Code (NESC). To comply with this requirement, WPSC initiated the PREP program in 1990 after the success of earlier pilot programs. The expected completion time of the first PREP cycle is January 1, 2002. Throughout the program, several process improvements have helped increase the effectiveness to find and eliminate potential code and safety problems before an accident occurs.

Each district is responsible for administering the PREP program for their overhead facilities. Support from the Electrical Distribution Engineering Department (EDE) is provided in the form of establishing standards, creating maps and tracking progress. Training is provided to the Inspectors on an as needed basis.

Trained PREP inspectors visit each pole in a given location based on information from the WPSC PREP record keeping system. The inspectors conduct a visual inspection on the following components: pole condition, guys, grounds, neutrals, transformers and overhead equipment, arresters, cross arms, services, insulators, conductors, signs, clearances, underground risers, and other items not listed here. Details of each of these components are found in the supporting documentation under WPSC Distribution Standards 1909-1 through 1909-4. Each component is rated according to its condition as described below. Repairs that can be made without slowing down the inspection process (i.e. signs, molding, guy markers, etc.) are corrected immediately. Inspection sheets (as shown in the supporting documentation under WPSC Distribution Standards 1901-5) are returned to the district supervisor where necessary repairs are scheduled.

### CONDITION RATING CRITERIA and CORRECTIVE ACTION SCHEDULE

The condition of each component is graded for each pole based on the following:

<u>Grade</u>	<u>Description</u>
3.	Requires follow-up work
4.	Replacement recommended
5.	Removal recommended

If no problems as described in the WPSC Standards are found, no grade is assigned to the component.

The inspectors then return the inspection sheets to the district supervisor. If no follow-up, replacement or removal is necessary, the inspection sheet is sent to EDE where the indicated poles are entered into the IFM system with their PREP completed date. If additional work is required on a given component, the district supervisor retains the inspection sheet and the necessary work is scheduled. Upon completion of the necessary work, a "2" is entered over the previous grade on the inspection sheet indicating that the problem has been corrected. When all follow-up, replacements or removals are completed and all component grades previously marked as a 3, 4, or 5 are changed to a 2, the completed sheets are sent to EDE for record entry and retention.

## RECORD KEEPING

A list of the facilities requiring inspection can be obtained at any time. The total for the cycle is updated every month so that each district can see how many poles need to be inspected by the end of the cycle. Only poles that do not require follow-up can be listed as completed. Thus all follow-up work is expected to be completed by the end of the cycle.

## SUPPORTING DOCUMENTATION

Exhibit A      WPSC Distribution Standards 1909-1 through 1909-5 - Preventative Repair of Electric Plant

Exhibit B      WPSC PREP Statistics

Exhibit A

<b>I. PURPOSE</b> The purpose of this procedure is to provide guidelines for the preventative repair of electric plant (PREP). This inspection of overhead systems is necessary to assure that they are constructed to electrical code.			
<b>II. GENERAL</b>			
<b>A. Accounting-</b>			
RC XXX	PROC 1 2310	PROC 2 7618	PROD 100 PREP inspection and minor repairs that do not need documentation as listed in GENERAL B. Paragraph one. 100 PREP maintenance repair work. Use appropriate maintenance process for PROC 1. 100 PREP construction work. Use a project number and appropriate construction process for PROC 1.
<b>B. Documentation -</b> Only the items that were corrected or need follow-up need to be recorded on the inspection form. (see example on 1909.4, form #159-2016) The following items are also covered by the inspection but the corrections do not need to be documented on the inspection form: ground level moulding; guy markers; High Voltage warning signs; URD riser signs.  On the form, enter the location number of the equipment where the needed corrections were made or follow-up is necessary. Also mark the results code in the appropriate square for that equipment. Be sure to enter the municipality and taxing district for all urban numbered poles.  Turn in the completed form to the district supervisor. Correct the items requiring additional work (indicated by codes 3, 4, and 5). After the inspection has identified items needing repair, the repairs will be made within a reasonable time as determined by the district based on the degree of the safety risk posed. Items posing an imminent risk should be addressed first if possible. It is important that all repairs are made and it is up to the district to allocate its resources appropriately to get this done in a reasonable time frame. When the needed corrections have been made, indicate the corrections on the form by writing a code 2 in RED over the existing code 3, 4, or 5.  After all necessary follow-up work has been completed, send the maps and forms indicating the areas inspected to Electric Distribution Engineering where the information will be entered into the IFM system and the records retained. This should be done on at least a quarterly basis.  Each Division/District is required to keep a set of either primary or pole maps indicating the areas that have been inspected by date.  NOTE: Customized maps or lists are available from IFM.			
<b>III. INSPECTION WORK</b>			
<b>A. Poles</b>			
1. Condition of Pole - Replace pole if it is a safety hazard to the public.			
2. Leaning Poles or Structures - Straighten pole if it presents a hazard to the public.			
3. Pole Steps - Remove permanent pole steps installed less than 8' from the ground line.			
<b>B. Guys</b>			
1. Guy Markers - Check to see if the top guy at all down guy locations has a guy marker installed. Replace deteriorated or damaged guy marker. See page 1319 of the Electric Distribution Standards book. The repair or replacement of guy markers need not be recorded on the inspection form.			
2. Excess Guy Strand - Remove any excess guy strand that could be a hazard to the public.			
3. Guy Strength - Check for adequate guy strength based on page 1302-1 through 1302-6 of the Electric Distribution Standards book.			
DATE 6-20-96 APPD RST DIST.ENG.		WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS  PREVENTATIVE REPAIR OF ELECTRIC PLANT	
		1909-1	

Exhibit A (Cont'd)

<p>4. Guy Insulation - Check to see if down guy locations are properly insulated or bonded. Make corrections where necessary. See pages 1309.1 and 1309.2 of the Electric Distribution Standards Book. See page 1301 for guy grips.</p> <p>Exception: A #2 porcelain strain insulator (135-4242) is adequate for insulation in the primary guys if the primary voltage is 14.4 KV single phase, 12.5 KV three phase or less.</p> <p>Where a guy is now attached to the opposite end of the bolt that holds the primary deadend, this guy shall be moved and attached to a separate bolt. Any guy that is in the secondary or neutral position and isn't bonded to the neutral, or properly insulated with a #2 strain, shall be insulated with a fiberglass strain insulator.</p>		
<p>C. Grounds</p> <p>1. Ground Requirements - Grounds shall be added, where needed to assure nine grounds per mile of line.</p> <p>2. Ground Rods - Check to see if ground rod is below ground line and the exposed ground wire is not damaged.</p> <p>3. Moulding - Add and replace moulding as required (see page 1208). In the first eight feet it's only needed in areas subject to pedestrian traffic, for example: urban areas, school yards, farm yards, lawn areas, residential areas, etc.</p> <p>The repair or replacement of moulding need not be recorded on the inspection form.</p>		
<p>D. Neutrals</p> <p>1. Approved connectors - Replace Non-approved Neutral Connections See page 619 of the Electric Distribution Standards book.</p>		
<p>E. Transformers And Overhead Equipment</p> <p>1. Equipment Grounds - Check to see if transformers and overhead equipment are grounded according to specifications listed on page 1201-1 to -3 of the Electric Distribution Standards book.</p> <p>2. Oil - Check all transformers and other oil-filled equipment for dripping oil leaks. Replace units which cannot be repaired in the field. If leaking equipment is not labeled "LESS THAN 50PPM" take an oil sample and have it tested for PCB's (see page 1403-1 thru 1403-5). Replace transformers if damaged bushings, tanks or hangers will cause an outage or safety hazard.</p> <p>3. Condition - Report all transformers with burnt paint. These should be checked for overload.</p>		
<p>F. Arresters</p> <p>1. Condition - Replace all failed arresters.</p> <p>2. Underground Primary Risers - Mount all three-phase riser pole arresters on the line side of the cutouts.</p>		
<p>G. Arms</p> <p>1. Arm Condition - Replace all deteriorated crossarms if they are in danger of breaking.</p>		
<p>H. Services</p> <p>1. Services - Inspect services for deteriorated insulation or inadequate clearance, and repair or replace as required.</p>		
1909-2	WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS PREVENTATIVE REPAIR OF ELECTRIC PLANT	DATE 1-19-96 APPD RST DIST.ENG.

Exhibit A (Cont'd)

I. Insulators

1. Damaged Insulators -

Replace any substantially damaged pin or suspension insulators.

J. Conductors

1. Damaged Conductors -

Replace or repair frayed or substantially damaged conductors.

K. Signs

1. "Warning - High Voltage" Signs -

Replace deteriorated or missing signs. See page 201-1 of the Electric Distribution Standards book.

The replacement or addition of these signs need not be recorded on the inspection form.

2. Underground Caution Sign -

Check to see if "Caution--Underground Electric Cable" signs, code number 135-5480 are installed on the U-guard. Replace missing or improperly installed signs.

The replacement or addition of these signs need not be recorded on the inspection form.

3. Unauthorized Signs and Equipment -

Check Company equipment for unauthorized attachment of signs and equipment. Remove or report. In general, private signs can be considered unauthorized.

L. Clearances

IT IS OF PRIME IMPORTANCE THAT CONDUCTOR CLEARANCES MEET CODE REQUIREMENTS UNDER ALL CONDITIONS. MAKE THE FOLLOWING CHECKS.

1. Primary -

Check overhead primary conductor clearances for compliance with the clearance indicated in section 1800 of the Electric Distribution Standards book. Correct clearance problems by moving conductors, re-sagging conductors, or pulling guys when possible. Report for follow-up any clearance problems which cannot be corrected by the inspector.

2. Secondary/Service -

Check secondary and service conductors for proper clearances. Refer to the Electric Service Rules book and to Section 1800 of the Electric Distribution Standards book. Correct clearance problems by moving, re-pulling or re-deadending conductors when possible. Report for follow-up any clearance problems which cannot be corrected by the inspector.

3. Telephone and CATV -

Check for proper clearances between WPSC and telephone company or CATV equipment. Correct violations when possible and report any situation which will require follow-up work by either WPSC or a foreign utility. Refer to page 404 of the Electric Distribution Standards.

4. Code Clearances-

a. Present Codes- Any conductors which meet the clearances presently in our clearance section are adequate.

b. Older Codes- The conductors can meet the present day code or they can meet the clearance requirements that they were originally installed under. Therefore, before doing any substantial amounts of work, check with your Division Engineer to see if it is necessary to make any corrections if the clearances don't meet the present requirements of the 1800 section, "Clearances".

DATE 4-14-94  
APPD RST  
DIST.ENG.

WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS

PREVENTATIVE REPAIR OF ELECTRIC PLANT

1909-3



Exhibit A (Cont'd)

M. UG Risers

1. Exposed Cable or Washouts -  
Exposed cable or washouts creating a tipping hazard or a hazard to the public, shall be corrected as soon as possible.
2. U-Guard -  
Replace or repair any missing U-guard.

N. Other

1. List any item that you have found during the inspection which you have corrected, would recommend for replacement, or would recommend for removal which does not appear as part of this inspection.

1909-4	WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS	DATE 4-14-94
	PREVENTATIVE REPAIR OF ELECTRIC PLANT	APPD RST DIST.ENG.

FORM 159-2016

## OVERHEAD MAINTENANCE INSPECTION

TO: EDE  
GREEN BAY A3  
ATTN: DISTRIBUTION OPERATIONS CLERK

DATE 7-8-92 DISTRICT RHINELANDER DISTRICT NUMBER 77  
MUNICIPALITY T-NASHVILLE TAX DISTRICT NUMBER 140 INSPECTOR W.E. LOKA

INSPECTION TO BE PERFORMED		LOCATION: <u>3515</u>									
		<u>33E15</u>	<u>33E6</u>	<u>28R34</u>	<u>28R15</u>	<u>28R13</u>	<u>28R14</u>	<u>28R33</u>	<u>28L3</u>	<u>28R7</u>	
POLES	CONDITION OF POLE										
	STRAIGHT POLES OR STRUCTURES										
	POLE STEPS	2									
GUYS	GUY STRENGTH										
	GUY STRAND										
	GUY INSULATION		2	2							
GROUNDS	GROUND REQUIREMENTS										
	GROUND ROD								2		
	MOULDING										
NEUTRALS	APPROVED CONNECTORS										
TRANS-FORMERS & OVERHEAD EQUIP.	EQUIPMENT GROUNDS				2						
	OIL										
	CONDITION										
ARRESTERS	3 Ø UG PRIMARY RISER				2						
	CONDITION					2					
ARMS	ARM CONDITION										
SERVICES	SERVICES										
INSULATORS	DAMAGED INSULATORS										
CONDUCTORS	DAMAGED CONDUCTORS										
SIGNS	UNAUTHORIZED SIGNS & EQUIPMENT										
CLEARANCES	PRIMARY										
	SECONDARY/SERVICE							2	2		
	TELEPHONE										
	CATV										
UG RISERS	EXPOSED CABLE OR WASHOUTS										
	U-GUARD								2		
OTHER											

INSPECTION RESULTS CODE

2 = SITUATION CORRECTED - OK NOW

3 = REQUIRES FOLLOW-UP WORK  
4 = REPLACEMENT RECOMMENDED  
5 = REMOVAL RECOMMENDED

DATE 4-14-94  
APPD RST  
DIST.ENG.

WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS  
PREVENTATIVE REPAIR OF ELECTRIC PLANT

1909-5

WPSC - Preventative Maintenance Plan  
Section: Preventative Repair of Electric Plant (PREP)

Chapter 2 – Distribution

Exhibit B

1JJC20/SAS PREVENTATIVE REPAIR OF ELECTRIC PLANT - (PREP)							
OVERHEAD INSPECTION MONTHLY REPORT TOTALS							
OPERATING DISTRICT	TOTALS THRU 11/30/2000				TOTALS FOR 2000		
	# POLES	# PREPED	# REMAIN	% PREP*	TO PREP 2000	# DONE	% DONE
	2	0	2	0.0%	0	0	0%
ANTIGO	15357	14645	712	95.4%	1514	3010	199%
CHILTON	14032	13656	376	97.3%	199	231	116%
EAGLE RIVER	12184	12109	75	99.4%	608	1311	216%
GREEN BAY	63577	61753	1824	97.1%	4888	10858	222%
KEWAUNEE	16043	15609	434	97.3%	892	2125	238%
MARINETTE	22269	15612	6657	70.1%	3459	389	11%
MENOMINEE	12763	7847	4916	61.5%	2460	154	6%
MERRILL	17859	16131	1728	90.3%	2456	3482	142%
MINOCQUA	27513	27280	233	99.2%	1323	2863	216%
OSHKOSH	25469	23918	1551	93.9%	4203	7831	186%
RHINELANDER	26156	25695	461	98.2%	1757	3679	209%
STEVENS POIN	23033	17589	5444	76.4%	3343	1751	52%
STURGEON BAY	25752	23857	1895	92.6%	3128	7727	247%
TOMAHAWK	12009	11941	68	99.4%	499	1054	211%
TWO RIVERS	27328	25543	1785	93.5%	2974	5394	181%
WABENO	21573	20755	818	96.2%	2104	3949	188%
WAUPACA	6926	5304	1622	76.6%	1044	1120	107%
WAUSAU	50487	43517	6970	86.2%	4990	4094	82%
WAUSAUKEE	21343	18185	3158	85.2%	1713	548	32%
COMPANY TOTALS	441675	400946	40729	90.8%*	43554	61570	141%
0* NOTE: SHOULD BE AT LEAST 91 % TO MEET THE 01/01/2002 COMPLETION DATE, BASED ON 01/01/1990 START DATE							

### III. UNDERGROUND SYSTEM INSPECTION

#### INSPECTION

WPSC presently administers two underground system inspection processes. The purpose of the Inspection and Energizing of New Underground Systems Procedure is to provide a means of inspecting all newly installed underground primary systems for completeness to ensure safety and code compliance. The Inspection of Existing Underground Systems Procedure provides guidelines for inspection and correction of in-service underground electrical systems.

WPSC Distribution Standards 4005-1 through 4005-6, section III describes the inspection procedure for new underground installations. The inspections include verification and checks of energy source, cable training, warning decals, location tags, cable tags, neutral connections, bonding and grounding, terminations, and other general installation practices. The details of each of these items are found in the fore-mentioned Standard, along with the inspection sheet. The inspection is completed prior to energizing the underground system.

The procedure for the inspection of existing underground systems is given in WPSC Distribution Standard 4007-1 through 4007-5. Properly trained inspectors conduct external condition inspections of all underground systems on a four-year cycle. In addition, all underground systems installed in the previous year are inspected in the current year. EDE provides maps and schedules of underground system inspections. External inspections are comprised of evaluating the following: Level and proper elevation, exposed cables or washouts, insect or rodent infestation, position with respect to building, operating obstructions, paint condition, tags and signs, locks and bolts, knockouts, need for protective barriers, oil leaks and support pads. In addition, mapping corrections are made at the time of the inspection as necessary. The details of each of these items are found in the fore-mentioned Standard, along with the inspection sheet.

#### CONDITION RATING CRITERIA and CORRECTIVE ACTION SCHEDULE

##### New Underground Systems

The inspected equipment is coded as follows on the Underground Inspection (New Installation) form:

<u>Code</u>	<u>Description</u>
1.	OK as found.
2.	Situation corrected; OK now.
3.	Requires follow up work to correct.
4.	Contractor Installation corrected by WPS crews.

Inspectors turn the completed forms in to the district supervisor. Follow-up work, indicated by a code 3, is scheduled for completion as soon as practical. Following the completion of all follow-up work, a 2 is entered over the previous grade (3) on the inspection sheet, indicating that the problem has been corrected. Completed inspection forms, those requiring no further follow-up work, are then sent to EDE for record retention.

Existing Underground Systems

The inspected equipment is coded as follows on the Underground System Maintenance Inspection form:

<u>Code</u>	<u>Description</u>
1.	OK as found.
2.	Situation corrected; OK now.
3.	Requires follow up work to correct.
4.	Operating problem but no safety hazard.

Inspectors turn the completed forms in to the district supervisor. Follow-up work, indicated by a code 3, is scheduled for completion as soon as practical. Following the completion of all follow-up work, a 2 is entered over the previous grade (3) on the inspection sheet indicating that the problem has been corrected. Completed inspection forms, those requiring no further follow up work, are then sent to EDE for record retention.

RECORD KEEPING

When EDE receives the completed inspection forms, the location number of each component and the date of completion are entered in to the IFM database as inspected. A new list of those facilities not inspected or needing an inspection can be obtained from EDE. Monthly updates describing the number of underground system components, number of those inspected, number of those needing inspection and percent inspected for each district are available on the WPSC intranet.

SUPPORTING DOCUMENTATION

- Exhibit A - WPSC Distribution Standards 4005-1 through 4005-6 - Inspection and Energizing of New Underground Systems
- Exhibit B - WPSC Distribution Standards 4007-1 through 4007-5 - Inspection of Existing Underground Systems

Exhibit A

I. GENERAL

The intent of this procedure is to provide a means of inspecting all newly installed underground primary systems for completeness to ensure that they present no hazards, can be safely operated, and are free of code violations. This includes all underground systems whether installed by contractor or by WPSC personnel. Complete inspection form # 159-2106 for all newly installed underground systems.

II. INSPECTION FORM

Enter each inspection on an Underground Inspection (New Installations) Form #159-2106. (See Exhibit #1.)

The estimator or clerk of each district will fill out the following items: Job Title, District, Work Order No., Contractor (including WPSC if installed by WPSC), Location No., and Taxing District. The inspector will fill out the remainder of the form.

Enter the location numbers of the transformers, junction enclosures, pedestals, pole risers, switchgear and loop enclosures contained in the system to be inspected on the form in the 'Inspection Results' portion. Immediately below the location number on the line marked 'EQPT' enter the 'Equipment Code' for the equipment at that particular location. Fill in the municipality when location is an urban number. During the inspection mark the results by inserting a 'result code' in the appropriate square. Only the inspection indicated by an 'X' needs to be performed on that particular type of equipment. Exhibit #1 gives an example of a form properly completed.

Result codes are to be used as follows:

1 = OK As Found.

2 = Situation Corrected; OK Now.

Items that did not meet requirements from Electric Distribution Standards when inspected, and necessary corrections have been made.

3 = Requires Follow-up Work To Correct.

When corrections cannot be made during inspection, district supervisor will hold form until corrections have been made; then inspector will indicate that all corrections are made by writing a Code 2 in red over the existing Code 3. System cannot be energized unless all items in Part I meet requirements.

4 = Contractor Installation Corrected By WPSC Crews.

When installation was done by a contractor and corrections were made by a WPSC employee in order to energize the system.

Turn in the completed forms to the district supervisor. Complete required follow-up work (indicated by Code 3) as promptly as practical. Indicate completion of follow-up work by writing a Code 2 in red over the existing Code 3.

After all follow-up work is completed, send form to Electric Distribution Engineering, A3, Attention: Line Coordinator.

DATE 8-1-88  
APPD RST  
DIST.ENG.

WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS  
INSPECTION AND ENERGIZING OF NEW UNDERGROUND SYSTEMS

4005-1

WPSC - Preventative Maintenance Plan  
Section: Underground System Inspection

Chapter 2 - Distribution

Exhibit A (Cont'd)

UNDERGROUND INSPECTION (New Installations) Prior to Performing Inspection Refer to Standards Page 4005.1 Thru 4005.6	
To: EDE-Services Green Bay A3 Attn: Electric Line Coordinator	
Job Title <u>TOM JONES EXT.</u> Date <u>6-24-88</u> District <u>CHILTON</u>	
Work Order No. <u>2006-88</u> Contractor <u>GABES</u> Inspector <u>JOE BROWN</u>	

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EQUIPMENT CODE	INSPECTION RESULTS CODE
T=Transformer J=Junction Enclosure P=Pedestal R=Riser S=Switch L=Loop Enclosure	1=OK as found 2=Situation corrected OK now. 3=Requires follow up work to correct. 4=Contractor installation corrected by WPSC crews.

Form 159-2106 Rev. 6-88

4005.2	WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS INSPECTION AND ENERGIZING OF NEW UNDERGROUND SYSTEMS	DATE 8-1-88 APPD RST DIST.ENG.
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Exhibit A (Cont'd)

III. INSPECTIONS

A. System Clear of All Sources of Energy.

PRIOR TO THE INSPECTION, VERIFY THAT THE RISER JUMPER(S) HAVE NOT BEEN INSTALLED AND THAT NO SERVICE CONNECTED TO THE SYSTEM CAN BE ENERGIZED FROM CUSTOMER EQUIPMENT TO PROVIDE BACKFEED. This will eliminate any need for protective grounding of the primary cable. However, complete all necessary Hold Carding. The primary cable must be clear of grounds; all elbows must be installed on their respective bushing at transformer locations; and the transformer fuses must be removed to make the required ohmmeter checks.

B. Cables For Future Use Cannot Become Energized

Check that the cables for future use are in a position so as not to become energized. See Page 3001.2, Waterproof all unterminated cable ends.

C. Cable Training

Check that the cable training and cable neutral training are adequate to allow proper operation of elbow terminators. Check that pole riser cables are not of excessive length. See Pages 3115-1,2, 3130, 3135, 3718 and 3735-1,2,3

D. Warning Decals Installed

Check that all warning decals are installed: 'Caution--Do Not Dig' sign, 'Caution--High Voltage Inside,' and 'Danger--Keep Away.' See Page 3718 for single-phase padmounts; see Page 3735-1,2,3 for three-phase padmounts; and see Pages 3810-1,2 for junction enclosures.

E. Location Tags Installed

Check that location tags are properly installed inside and out. See Page 3010.

F. Primary Cable Tagged (Ohmmeter Check)

Use the following procedure to determine that the primary cable is correctly tagged as shown on Pages 3011-1 thru 3011-4 and that primary conductor is continuous.

1. Single-phase System

a. Starting at the last transformer on the system, remove the source elbow and check with an ohmmeter from elbow contact rod to ground. The reading should be infinity (open circuit). Then check that the cable tag indicates proper direction and next location. Check that elbow and bushing are properly lubricated. Reinstall elbow; install fuse in bayonet; and close bayonet.

b. At each succeeding transformer or junction location, first remove the load side elbow and check with ohmmeter from elbow contact rod to ground. The reading should indicate continuity (continuity to ground through winding of last transformer). This identifies it as the load cable. Check that cables are correctly tagged. Check that elbows and bushings are properly lubricated. Reinstall elbows; fuse bayonet; and close the bayonet.

DATE 8-20-96  
APPD RST  
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WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS

INSPECTION AND ENERGIZING OF NEW UNDERGROUND SYSTEMS

4005-3



Exhibit A (Cont'd)

c. If cable loop enclosures are used in the system to delay transformer installation, correct cable tagging cannot be verified in the enclosure at this time. However, when the transformer is installed, verify tagging as follows. At the new transformer install the source-side elbow on its transformer bushing and the other elbow on an insulating storage bushing. Cover vacant bushing with an insulating cap. Energize cable and transformer by closing elbow at adjacent source-side transformer. Check voltage at new transformer. If transformer is energized, it will verify cable identity for correct tagging. Complete remaining switching as required.

2. Three-phase Systems

Use single-phase procedure for ohmmeter check and cable tagging except as follows. Starting at the last transformer (bayonet fuses and three-phase sectionalizing switches closed) close the source-side elbows one at a time, and check for ground continuity of each cable at the adjacent transformer.

G. Secondary and Services Tagged Properly

Check that cable tags are in place at terminations and meter bases. (See Page 3011-1 thru -4.)

H. All Neutrals Properly Connected

It is essential that all neutrals are properly connected.

1. Check that primary neutrals are connected together with a copper conductor equivalent in size to the cable neutral.
2. Check that our concentric neutral end is connected to the tank ground of the transformer, junction enclosure, or switch, and that all other neutral or ground connections are attached to this neutral.
3. Check that secondary neutral grounding strap and jumper is in place.
4. Check that secondary neutral bushings are connected to primary neutrals.
5. Check that riser pole neutrals are interconnected with overhead system neutral. See Electric Distribution Standards book Pages 3717-1,2 and 3718 for single-phase padmounts and Page 3735-1,2,3 for three-phase padmounts. (NOTE: a few three-phase padmounts have a floating Wye secondary. See Page 3735-3, Note 16 for warning sign requirements. In these cases no connections are made to the secondary neutral bushing.) See Pages 3810-1,2 for neutral connections at junction enclosures.

I. All Grounds and Bonds Properly Connected

'Ground Connections' - Ensure that ground connections are correctly made and that any communication grounds present in the transformer are connected to the ground rod wire. Bond all bushings and components to ground. See Pages 3717-1,2 and 3718 for single-phase padmounts, Pages 3735-1,2,3 for three-phase padmounts, Page 3810-1,2 for junction enclosures, Pages 3115-1,2 for pedestals and Pages 3101-1,2 for risers.

J. Secondary and Services Connected

Check that secondary and service cable terminations are complete. Check that service at customer's end will not present a hazard.

4005-4

WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS  
INSPECTION AND ENERGIZING OF NEW UNDERGROUND SYSTEMS

DATE 8-20-96  
APPD RST  
DIST.ENG.

Exhibit A (Cont'd)

- K. Proper Position on Dual-voltage Switches  
Check that series/parallel switches are in proper position.
- L. Route Location Signs  
Check that cable route signs are in place as described on Page 3001-2, Para. M.
- M. Proper Position of Sectionalizing Switches  
Check to see that the gang operated 200 amp switches are in proper position.
- N. Well Plugs Installed in Vacant Wells  
Check that well plugs are installed as described on Page 3716-2, Note 7.
- O. Insulating Caps Installed  
Check that insulated caps are installed and bonding jumper is connected.
- P. Insulating Covers on Secondary Spades  
Check that the insulating covers are in place.
- Q. Equipment Secured to the Pad  
Check that padmounts are properly secured to pad. See Page 3712.
- R. Equipment Locked and Bolted  
Check that equipment is locked and that a pentahed bolt is installed.  
Check that hinge pin locking tab is present.  
At time of inspection, install tamperproof lock on pedestals.

The following items need not be completed prior to energizing the system.

S. Equipment Level and Bermed

Transformers - See Pages 3712, 3715, 3717-1,2 and 3730.

Junction Enclosures - See Pages 3810-1,2.

Risers - See Pages 3010-1,2.

Pedestals - See Pages 3115-1,2.

Loop Enclosures - See Pages 3140-1,2.

Be sure all equipment is within 5' of level. (Approximately 1" rise per 12' run) Remove any soil over the top of a pad and against the transformer. In cases where flooding of the equipment or serious operating problems will occur due to low level of pad, raise the unit. Check that the pad is bermed and firmly in place with no washouts, openings under pad, ant infestation, or danger of tipping present. Check that there are no operating obstructions or plant growth around the equipment.

T. Trench Is Properly Backfilled

Check that cable trench is properly backfilled.

U. Information Decals Installed

Check that decals are installed if required "Please keep fences, shrubs, etc., at least 8' from this side," and "Triplex Core." See Page 3718 for single-phase padmounts; see Pages 3735-1,2,3 for three-phase padmounts; and see Pages 3810-1,2 for junction enclosures.

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APPD RST  
DIST.ENG.

WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS

INSPECTION AND ENERGIZING OF NEW UNDERGROUND SYSTEMS

4005-5

Exhibit A (Cont'd)

V. Equipment Condition

Check that paint is not chipped or gouged. Check that lift bolts are removed.

NOTE: Correct as required any conditions which are electrically unsafe prior to energizing the system in order to provide a safe system for the public and for the Company personnel.

IV. ENERGIZING SYSTEM

- A. On contractor installed installations the contractor will sign and turn in the completed Job Order to the district office. After the Job Orders are turned in, the contractor will consider the system energized.
- B. Energize system and check voltage at each transformer. On three-phase systems identify and tag service cables for phase identification and rotation per Electric Distribution Standards book Pages 3012-1.2.
- C. Secure all covers by tightening penthead bolts and installing padlocks as required.

4005-6	WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS	DATE 8-20-96
	INSPECTION AND ENERGIZING OF NEW UNDERGROUND SYSTEMS	APPD <i>RST</i> DIST.ENG.

Exhibit B

I. Purpose

The purpose of this procedure is to provide guidelines for periodic inspection of underground systems. This inspection is necessary to assure that the equipment is secure, does not present a hazard to the public and is in good operating condition. Any safety hazard found shall be reported promptly and corrected as soon as practical. Operating problems found may be corrected at the discretion of the site scheduler.

II. General

A. Inspector Qualifications

External inspections do not involve exposure to energized areas of equipment. These may be made by any employee who has been trained to recognize external and internal operating, maintenance and security requirements.

B. Inspection Frequency

External inspections of all underground systems should be performed on a four-year cycle, to be completed by 1-1-2000. In addition, all underground systems installed the previous year, should be inspected in the current year.

C. Inspection Schedule

A listing of all installed URD facilities is accessible in each site through the computerized URD system inspection/PREP Program. Maps are also available for the installed facilities. If assistance with the listing or maps is needed, contact Electric Distribution Engineering.

D. Inspection Form

Each inspection made shall be entered on a "UG System Maintenance Inspection" form 159-2014.

The location numbers of the transformers, junction enclosures, pedestals, switchgear and loop enclosures contained in the system to be inspected shall be entered on the form in the "Inspection Results" portion. The numbers should be listed in the sequence they are inspected. Immediately below the location number on the line marked "EQPT" enter the "Equipment Code" for the equipment at that particular location.

During the inspection, the inspector shall mark the results in the appropriate square whenever the "Equipment To Be Inspected" columns indicate that a given "Inspection To Be Performed" should be done on that particular type of equipment. The results should be indicated according to the "Inspection Results Code." Exhibit \*1 gives an example of a form properly completed for an external inspection.

Route completed forms to the site scheduler. Items requiring follow-up work (indicated by an "Inspection Results Code" 3) shall be corrected as promptly as practical. When inspection results Code 3 items have been corrected, these corrections should be indicated on the forms by writing in a Code 2 in red over the existing Code 3.

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Exhibit B (Cont'd)

After all necessary follow-up work is completed, the forms shall be sent to Electric Distribution Engineering where the information will be entered into the IFM database.

E. Accounting

RC	PROC 1	PROC 2	PROD	
XXX	2311		100	External inspection
XXX	23XX	7618	100	Urd maintenance repair work. Use appropriate maintenance process for PROC 1.
XXX	21XX	7618	100	Urd construction work. Use a project number and appropriate construction process for PROC 1.

III. Inspection

A. External

External inspections should include the following in addition to any requirements listed on the indicated Electric Distribution Standards Book pages.

1. "Level and Proper Elevation" - Transformers - see pages 3720, 3712, 3715, 3717-1,2 and 3730; Junction enclosures - see pages 3810-1,2, 3811, and 3812; Pedestals - see pages 3115-1,2; Loop Enclosures - see pages 3140-1,2. All equipment should be within 5 degrees of level (approximately 1" rise per 12" run). Any soil over the top of a pad and against the transformer should be removed. In cases where flooding of the equipment or serious operating problems will occur due to low level of pad, consideration should be given to raising the unit.
2. "Exposed Cable or Washouts" - Exposed cable or washouts creating a tipping hazard or a hazard to the public, shall be corrected as soon as possible.
3. "Indication of Ant or Rodent Infestation" - Either of these can result in equipment damage and operating difficulties.  
Purchase pesticides locally For Ants: ORTHO diazinou Granules  
For Rodents: d-Con for Rats and Mice (pre-packaged bait pacs)
4. "Position with Respect to Building Openings" - see pages 3712 and 3730. The requirements on pages 1805-1,2 apply to transformers installed after April 1972.
5. "Operating Obstruction" - Inspect the general area around the equipment to see that elbow terminators, bayonets and switches can be operated properly and safely. Also check that secondary connections can be worked on safely.  
"Please keep fences, shrubs, etc. At least 8 feet from this side" Sign - (135-5470) can be added to padmounts, and junction enclosures where you feel it could act as a deterrent. See pages 3716-1,2 for single-phase padmounts, 3735-1,2,3 for three-phase padmounts, 3810-1,2 for junction enclosures.
6. "Paint Condition" - Minor paint deterioration or rust need not be corrected. In cases of serious deterioration where corrective action is judged to be necessary, wire brushing and application of primer and paint is usually necessary to properly correct the problem. Primer - (111-5274). Bell green - (142-4758).

4007-2	WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS	DATE 7-11-96
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Exhibit B (Cont'd)

7. "Location Tag" - Check that an equipment location tag is affixed to the outside of the unit and that it is legible and correct. See pages 3010-1,2.
8. "Caution High Voltage Inside Sign" - (134-6679 or 134-6680). Each padmount, junction enclosure, loop enclosure, and switchgear shall have a sign affixed to it. USE THE APPROPRIATE SIZE SIGN THAT FULLY COVERS THE EXISTING SIGN. See Pages 3716-1,2 for single-phase padmounts, 3735-1,2,3 for three-phase padmounts, 3810-1,2 for junction enclosures, and 3140-1,2 for loop enclosures for proper sign placement.
9. "Caution Underground Electric Cable Sign" - (135-5480) Each pedestal should have a sign affixed to it. For proper sign placement, see pages 3115-1,2.
10. "Padlock or Locking Device" - Check that equipment is properly secured. In every case the padlock or locking device should be checked to assure that it is securely closed.
11. "Penta-Head" and hex head bolts - Check for them at surface mounted equipment containing voltages greater than 600 volts.

Replace all missing bolts with penta-head bolts.

Replace all hex head bolts with penta-head bolts.

Replacement bolts, protective cups and associate parts are in stock under the following code numbers:

Penta-head bolt 1 5/8" long	135-0480
Roll pin (retainer) for 135-0480 bolt	135-4700
Penta-head bolt 1 1/4" long	135-0475
Retaining ring for 135-0475 bolt	135-4900
Washer for penta-head bolt	135-9625
Protective cup for penta-head bolts	135-3275

Although retaining rings and pins are available for use with replacement penta-head bolts, the rings or pins need not be installed with the bolt initially if this will cause a delay in getting the bolt installed.

In order to facilitate the retrofitting of surface mounted units, report with a code 3 any locations with no provision for bolts. (Penta bolt retrofit procedures pages 3722-1,2. Latch kit 135-0500)

Note locations with No provisions for bolts.

12. "Knockout Holes Closed" - All knockout holes in padmounts and pedestals shall be securely covered with a knockout cover (Replacement covers 134-5990 for padmounts and 134-5991 for pedestals.) or covered so as to inhibit entry.
13. "Protective Posts Needed" - Posts should be installed in cases where unusual hazards exist due to traffic, snowplowing, etc. particularly if past damage is evident. For post placement at three-phase padmounts, see page 3729.

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Exhibit B (Cont'd)

<p>14. "Oil Leakage" - Any evidence of oil leakage from a padmount shall be reported.</p> <p>15. "Support Pad Condition" - Badly deteriorated transformer or switch pads should be reported.</p> <p>16. "Route Signs &amp; Equipment Markers" - Check that route signs are installed in accordance with pages 3001-1 thru -4 and that marker posts are installed at junction enclosures in accordance with pages 3810-1,2. (UG cable marking post 134-6020)</p> <p>B. Mapping Corrections</p> <p>The inspection will provide an opportunity to correct certain mapping errors which may exist on the primary maps. Map corrections should be made as the inspections proceed.</p>	<table border="1"><tr><td data-bbox="272 1753 421 1837">4007-4</td><td data-bbox="421 1753 1197 1837">WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS INSPECTION OF EXISTING UNDERGROUND SYSTEMS</td><td data-bbox="1197 1753 1313 1837">DATE: 7-11-96 APPD. RST DIST. ENG.</td></tr></table>	4007-4	WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS INSPECTION OF EXISTING UNDERGROUND SYSTEMS	DATE: 7-11-96 APPD. RST DIST. ENG.
4007-4	WISCONSIN PUBLIC SERVICE CORPORATION DISTRIBUTION STANDARDS INSPECTION OF EXISTING UNDERGROUND SYSTEMS	DATE: 7-11-96 APPD. RST DIST. ENG.		

Exhibit B (Cont'd)

UG SYSTEM MAINTENANCE INSPECTION																	
To: EDE Green Bay A3 Attn: Distribution Operations Clerk										Form 139-2084 Rev. 4-91							
District <u>GREEN BAY</u> Municipality <u>ALLOUEZ</u>										Date <u>MAY 31, 1991</u> Inspector <u>TOM SMITH</u>							
INSPECTION TO BE PERFORMED	EQUIPMENT TO BE INSPECTED					INSPECTION RESULTS											
	T	S	J	P	L	19	20	21	22	23	24	25	26	27	28	29	30
EXTERNAL																	
LEVEL AND PROPER ELEVATION	X	X	X	X	X	/	2	/	/	/	/	/	/	/	/	/	/
EXPOSED CABLE OR WASHOUTS	X	X	X	X	X	/	/	/	/	/	/	/	/	/	/	/	/
INDICATION OF ANT OR RODENT INFESTATION	X	X	X	X	X	/	/	/	/	/	/	/	/	/	/	/	/
POSITION WITH RESPECT TO BUILDING OPENINGS	X					/	/	/	/	/	/	/	/	/	/	/	/
OPERATING OBSTRUCTION	X	X	X	X	X	/	/	/	/	/	/	/	/	/	/	/	/
PAINT CONDITION	X	X	X	X	X	/	/	/	/	/	/	/	/	/	/	/	/
LOCATION TAG	X	X	X	X	X	2	2	/	/	2	/	/	/	/	/	/	/
"CAUTION HIGH VOLTAGE INSIDE" SIGN	X	X	X	X	X	2	2	/	/	2	2	2	2	2	2	2	2
"CAUTION DO NOT DIG" SIGN				X	X	/	/	/	/	/	/	/	/	/	/	/	/
PADLOCK OR LOCKING DEVICE	X	X	X	X	X	/	/	/	/	/	/	/	/	/	/	/	/
PENTA HEAD BOLT	X	X	X	X	X	/	/	/	/	/	/	/	/	/	/	/	/
KNOCKOUT HOLES CLOSED	X			X	X	2	/	/	/	/	/	/	/	/	/	/	/
PROTECTIVE POSTS NEEDED	X	X	X	X	X	0			0	0	0	0	0	0	0	0	0
OIL LEAKAGE	X					/	/	/	/	/	/	/	/	/	/	/	/
SUPPORT PAD CONDITION	X	X				/	/	/	/	/	/	/	/	/	/	/	/
ROUTE SIGNS / MARKERS			X							0							
COMMENTS:  <i>Operating obstruction: Tree planted in front of door.                  Has <u>no</u> provisions for penta head bolt.</i>																	
EQUIPMENT CODE					INSPECTION RESULTS CODE												
T=Transformer J=Junction Enclosure P=Pedestal S=Switch L=Loop Enclosure					0 (or blank) = Not applicable - Not checked. 1 = OK as found. 2 = Situation corrected OK now. 3 = Requires follow up work to correct. 4 = Operating problem but no safety hazard.												
EXHIBIT I																	
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#### **IV. POLE INSPECTION AND TREATMENT**

##### **INSPECTION**

The purpose of the Wood Pole Inspection and Treatment Program is to verify that each pole inspected meets the minimum strength requirements and to establish a treatment schedule. WPSC currently uses qualified pole inspection and treatment contractors to implement the program following the procedures described in the WPSC Electric Operating Procedures No. D-2.20 - Wood Pole Inspection & Treatment By Contractors.

The EDE Forester provides the contractor with maps indicating each pole that is eligible for inspection and treatment. The pole inspection and treatment program is a 12-year cycle. The procedure for inspection is found in the fore-mentioned Electric Operating Procedure. The basic requirements are visual inspection, sound and bore inspection and partial excavation sound and bore inspection. In association with scheduled wood pole inspection and treatment, the contractor is also responsible for inspection and repair of the pole ground wire and rod. The details for each process are provided in the procedure. All poles that pass inspection are then treated by methods described in the procedure.

##### **CONDITION RATING CRITERIA AND CORRECTIVE ACTION SCHEDULING**

Based on the results from the visual inspection and the sound and bore inspection, poles with greater than three inches of shell thickness pass the inspection process. They would then be treated according to the procedure and marked on the inspection report as such. Poles identified as having a shell thickness of less than three inches but greater than two inches would be identified as a reject pole. Poles found to have less than two inches of shell thickness will be designated as danger poles. Reject and danger poles are tagged as described in the procedure and separately identified on the Reject and Danger Pole Summary form. The contractor also immediately reports danger poles to the district supervisor.

The district supervisor is responsible for assigning a corrective action schedule. WPSC personnel inspect danger poles within two days of notification by the contractor. Danger poles are to be changed within a month based on the district's assessment of the situation. Reject poles are to be re-inspected by district personnel; and if replacement is deemed necessary, the poles are to be replaced within two years.

##### **RECORD KEEPING**

Records are kept in two ways: 1) in hard copy report form as filled out by the contractor as described in the procedure, for 12 years, and 2) in electronic form once each project area is completed. The poles identified by our IFM System as eligible are given the completion date as their inspection date. This is retained until they are inspected again.

SUPPORTING DOCUMENTATION

Exhibit A WPSC Electric Operating Procedures Section No. D-2.20  
“Wood Pole Inspection and Treatment by Contractors”

Exhibit A

WISCONSIN PUBLIC SERVICE CORPORATION  
ELECTRIC OPERATING PROCEDURES

SECTION LINE MAINTENANCE

PROCEDURE WOOD POLE INSPECTION & TREATMENT  
BY CONTRACTORS

DATE: 3/30/94 NO. D-2.20

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Exhibits

Exhibit 1	Tagging Requirements
Exhibit 2	Wood Pole Inspection and Treatment Report
Exhibit 3	WPSC Wood Pole Inspection Reject & Danger Pole Summary

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A. General

Overall Objectives

- \* Provide uniform procedures governing quality, quantity and type of wood pole inspection and treatment work that is performed by Wisconsin Public Service Corporation.
- \* Provide background information on the reasons for standard wood pole inspection and treatment procedures.
- \* Provide a standard reference containing the basic wood pole inspection and treatment procedures of Wisconsin Public Service Corporation.

B. Program Scheduling and Management

The Electric Distribution Engineering (EDE) forester is responsible for program scheduling and management. EDE will provide each district office with a master map of the project area scheduled for inspection and treatment. The district will review the proposed project area identifying and notifying EDE of any locations scheduled for relocation, removal, PREP, or conversion work. The program will be appropriately adjusted.

C. Public Relations

The Company strives in every way possible to maintain good relations with the public. The actions of the contractor reflect on the Company. Therefore, the contractor should give diligent consideration to the interests of property owners, tenants and the general public, whenever involved, and shall carry out the work in such a manner as to cause a minimum of inconvenience to all concerned.

D. Notification

The contractor shall notify the company Electric Distribution Engineering Department (EDE) Forester at least five full working days prior to beginning this project and at least five full working days prior to all subsequent moves to new districts. The contractor shall notify the Company district office before beginning work in the new district. The contractor's foreman shall arrange for daily consultation with each Company district representative involved. Consultation shall include work location, adding or removing crews and danger pole reporting.

E. Poles to be Inspected and/or Treated

- \* All poles marked on each district's project area pole map are included in yearly program. Eligible WPSC-owned poles are marked by a pole number and solid black dot immediately next to the number. Any pole marked by a pole number and open circle is foreign owned. Any pole indicated just by its pole number is WPSC owned but, according to current records, is not eligible.

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- \* All poles within the general treatment project area defined by the pole maps with brand dates of 12 years or older and 12 years or older for previously inspected and treated poles are included in yearly program. Poles on the pole maps will only be included in yearly program when there are WPSC attachments to the pole(s). A map and project area is not considered complete until all eligible poles are inspected or inspected and treated. Work shall not begin on a new map until the previous map started is completed.
- \* All poles within the general treatment area defined by the pole maps marked with an "Osmoband" or "Patox" tag dated 6 years ago or older are included within the scope of this project.
- \* All Cellon treated poles (SPG or SPX brands) within the general treatment area defined by the pole maps are included within the scope of this project.
- \* Guy and pole stubs meeting any of the previous criteria are included within the scope of this project. Pole stub banding should also be inspected to insure good condition.

NOTE: Do not inspect or treat customer poles or foreign poles unless directed to by a Company representative.

F. Inspection Procedure

The contractor will locate in the field all poles meeting the inspection/treatment criteria outlined in Section E of this procedure. The type of treatment each pole receives or designates as a reject or danger pole is determined by inspection.

\* Visual Inspection

One or more of the following will constitute a visual inspection.

- Any pole erroneously designated for inspection/treatment by the Company. In this case, a full visual review and report will be made.
- Any pole which the Company desires information on.
- Pole with different pole identification than indicated.
- The following which includes but is not limited to reporting:
  - \* Insect/Ant Damage (Location and Dimension)
  - \* Mechanical Damage (Location and Dimension)
  - \* Groundwire damage that contractor can't repair
  - \* Damaged crossarms, cables, insulators, braces, hardware, etc.
  - \* Missing pole identification or Danger High Voltage Sign
  - \* Other pole damage (i.e., woodpecker holes, defective top, cracks or breaks across the grain, or fire damage, etc.)

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\* Sound and Bore Inspection

- The pole shall be sounded by hammer from the groundline to a height of 8 feet or as high as the inspector can reach in a circumfluous manner.
- The pole will be bored to determine the presence of internal decay. At least one test boring (maximum 3/8" diameter bit) below groundline will be taken one inch to the side of and parallel to the deepest check extending below groundline. The boring shall be taken at a 45 degree angle and proceed past the center of the pole in depth.

If decay pockets are detected by sounding or boring, then additional borings (minimum 3) shall be taken to determine the extent of decay. A shell thickness indicator will be used to determine the extent of any internal decay.

- Poles set in pavement or which have concrete collars within six inches of the groundline, or which cannot be completely excavated for other reasons shall be bored as low as possible at a 45 degree angle so that the bit penetrates past the center of the pole.

All inspection holes shall be plugged with appropriately sized tight fitting treated wood dowels. Care should be taken to ensure that no inspection hole is left unplugged.

\* Partial Excavation - Sound and Bore (Bid Unit)

Poles set in earth which can be excavated shall be sounded as previously described then partially excavated and bored. A shovelful of earth (10" deep) shall be removed from the side of the pole to be bored.

If internal decay is suspected, the pole shall be bored first in the questionable area starting about two inches below groundline and angling downward at a 45 degree angle past the center of the pole. The second partial excavation and boring shall be made 90 degrees to the first. The pole must be carefully inspected for external decay at least ten inches below groundline at each boring location.

G. Reported Reject and Danger Poles

A reject or danger pole designation is given to a pole found through inspection to have internally decayed according to the following criteria. In either case, no further treatment is undertaken.

Reject Poles

Poles identified as having deteriorated to a shell thickness less than 3" will be designated "reject" poles. The contractor will tag (Section J) reject poles and mark their location on the pole maps. The pole report form is completed prior to leaving the site. Reject poles may be detected by sounding and boring before or after excavation.

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### Danger Poles

Poles identified through visual inspection as being in imminent danger of failure, or found to be deteriorated to a shell thickness less than 2" will be designated "danger" poles. The contractor will tag (Section J) and report danger poles directly to the Company's district supervisor the same day they are identified. Danger poles will also be appropriately noted on the pole maps and a pole report form completed. Danger poles may be detected by sound and boring before or after excavation.

### H. Treatment

Following inspection, each pole will be treated as specified and tagged according to Section J.

All treatment types will be done on a selective basis according to criteria laid out by treatment type.

#### \* Full Excavation and External Treatment

Poles that are inspected by partial excavation which are not rejected, but which are found to have outer decay or mechanical damage extending below groundline, shall be fully excavated to a depth of 18 inches and inspected and externally treated.

All excavatable poles included within the scope of this contract will be dug to a depth of at least 18" as measured to the shallowest part of the hole. Tarps shall be used to contain the excavated soil while treatment is being made. Notes should be made prior to excavation of any poles leaning over 10 degrees from vertical on report. Estimate degree of lean.

Pole keys, when encountered, shall not be removed. Rather, excavate as much of the pole as possible according to guidelines, treat the pole and note in report.

The pole surface shall be scraped clean. Any external decay shall be removed with proper tool and care used not to remove or penetrate sound wood. The circumference before and after decay removal will be compared to a company (Electric Distribution Standards Pages 207-1 and 207-2) table. Poles found to be deteriorated below minimum circumference for the pole's original class designation shall be externally treated and then noted in remarks column of report that pole's class has changed. Indicate new class number and whether pole has transformer on it.

Excavated poles found to be sound will be externally treated.

The pesticide/preservative treatment used shall be approved by the EDE Forester. Application shall be made following product label instructions and all existing federal/state rules and regulations. Product label and material safety data sheet for all materials being used on job site must be readily available.

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The treatment will be applied in a layer not less than 1/16" thick to the exterior surface of the pole from a depth of 18" below grade to 2" above grade. Particular care shall be taken to ensure that checks are well treated. The pole shall be wrapped with an approved moisture barrier extending from 18" below grade to 1" above the applied chemical layer and 4" overlapping edge. The wrap shall be held firmly in place by stapling.

After treatment, all poles will be solidly backfilled. The first 1/3 of the excavation will be backfilled and tamped using feet in the hole around the pole, the second 1/3 backfill and tamp and then backfill the last 1/3. The excess fill should be banked to a maximum of 3" above normal ground level to allow for settling. Care should be taken not to tear the moisture barrier.

\* Internal Treatment/Fumigation (Bid Unit)

Cellon poles that cannot be completely excavated shall be treated with an internal wood fumigant; also, previously fumigated poles and poles with incipient decay shall be treated with an internal wood fumigant. Any other poles requiring fumigation shall be done with the agreement of the EDE Forester.

The pesticide/preservative treatment used shall be described in writing and approved by the EDE Forester. Application shall be made following product label instructions and all existing federal/state rules and regulations. Product label and material safety data sheet for all materials being used on job site must be readily available.

Required hole depth (described in the table below) provide a void space with a volume equal to that of the quantity of fumigant that must be applied.

NUMBER OF HOLES REQUIRED IN POLES OF DIFFERENT SIZES TO HOLD VARYING AMOUNTS OF FUMIGANT

Diameter <u>Inches</u>	Total Length* <u>Inches</u>	Less than 32" <u>( 3/4 pint)</u>	34-45" <u>(1 pint)</u>	More than 45" <u>(2 pints)</u>
3/4	15	3	4	-
3/4	24	-	-	6

\*Effective length of holes is 2 inches less to allow for a 2-inch treated plug.

Starting at the groundline, adjacent to the deepest check, and only in 20°-70° zone of each quadrant relative to the overhead line, drill toward the center of the pole at a steep downward angle that will avoid going through the pole. If the required depth for the fumigant holes cannot be achieved for reasons beyond the contractor's control, this fact and the reason why the borings are short must be recorded on the inspection form. Use previously drilled holes by carefully extracting plugs whenever encountered.



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Care shall be taken, during drilling, to avoid intersecting a seasoning check. If this is not possible, do not fumigate.

Equally space the holes around the pole upward in a spiral pattern with a vertical distance of 6 inches between holes.

Fumigant should not be placed in poles with voids. Much of the fumigant placed in voids (decay pockets) will be lost through any seasoning checks which intersect the pockets.

The lowest hole shall be filled first with the prescribed amount of fumigant.

Insert and drive in plug carefully so fumigant does not squirt from the hole. Work up and around the pole, filling and plugging the holes as work progresses. Plugs must fit tightly all around; if not, caulking may be used and then noted.

\* Internal Treatment of Void or Heart Rot

Non-rejected poles which contain enclosed pockets or heart rot or insect gallery shall be treated with a liquid pesticide preservative approved by the EDE Forester.

After the extent of void has been determined through boring, the preservative shall be pumped into the bottom hole until it is about to run out of the next higher hold; this procedure is following until the cavity is filled or a maximum of one gallon is used. If preservative has not flowed up to the top hole, a maximum of one gallon shall be pumped into this hole. All holes that have not been previously plugged shall be plugged at this time with tight-fitting treated dowels. If the liquid cannot be contained, proceed only to coat, internally, all surfaces of the void(s).

I. PESTICIDE HANDLING

- \* Pesticides used by the contractor are approved by the EDE Forester.
- \* All pesticides shall be applied in accordance with product label instructions and all existing state/federal laws and regulations.
- \* All pesticide applicators shall be a certified and licensed commercial pesticide applicator by the Wisconsin and Michigan (In MI only when assigned) Department of Agriculture, Trade and Consumer Protection in the wood preservation pest control category.
- \* Each vehicle used for transporting chemicals shall be equipped with a shovel and absorptive material for controlling a spill. All chemical spills shall be reported immediately to the Company and required governmental authority.
- \* Pesticides when left unattended are stored in locked compartments.
- \* The contractor shall comply with the state pesticide application record keeping requirements.

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- \* A copy of this record shall be made and given to the district supervisor.

J. TAGGING POLES

All poles being reported, inspected or treated shall be marked with the appropriate aluminum tag and fastened with a galvanized or aluminum nail. The job is not considered complete until all poles are properly tagged. Treatment tags indicating the contractor's name and year of treatment shall be attached to the pole in a position below the pole number on poles with horizontal pole number tags and to the left of the pole number on poles with vertical pole number tags. Treatment tags shall be attached in such a way that they don't cover any pole brand marks. (See Exhibit 1)

K. Inaccessible Poles

Poles made inaccessible or untreatable to the treating crew due to situations beyond the contractor's control should be reported to the Company. A decision will be made by the Company to waive required treatment or reschedule treatment after access can be attained.

L. Groundwire Inspection and Treatment

In association with scheduled wood pole inspection and treatment activities inspection and repair of groundwire below and immediately above the groundline will be done by the contractor.

- \* Inspection and Tightening of Groundwire/Ground Rod Clamp Connection

The contractor shall inspect the condition of the clamp connection between the groundwire and ground rod(s). If loose, the clamp shall be tightened, if possible, or replaced.

- \* Reclamp Groundwire/Ground Rod Connections

The contractor shall replace missing, broken and defective groundwire/ground rod clamp connections. The groundwire and ground rod shall be wire brushed clean of all soil and excess oxidation. One screw type clamp connector shall be used for each ground rod. The Company will provide the appropriate clamps for this application.

- \* Groundwire Splice

Where the groundwire is broken and/or where sections of groundwire are missing, the contractor shall re-splice the wire. The groundwire shall be wire brushed clean of all soil and excess oxidation. Proper size compression sleeve splices will be used. The Company will provide the necessary sleeves and wire required for this application. All splices must be made above ground. Be sure compression tools are properly gauged.

- \* Replacement of Groundwire Molding

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Replace shattered or missing molding. Molding shall be replaced using one full length section (10') as supplied by the Company. The Company will provide the necessary wood molding section and staples. Staples holding molding to the pole should be driven no more than 3' apart and within 6" of the molding top. Molding should start below ground line.

\* Redrive Ground Rod

Only where an existing ground rod is exposed above the solid grade shall it be re-driven to 6" below soil grade. Redriving shall be accomplished in a manner which minimizes damage to the ground rod itself, the clamp connection and groundwire. If re-clamping was determined by initial inspection as necessary and ground rod is exposed above soil grade, redriving of the ground rod shall take place before the re-clamp of groundwire to ground rod.) Existing ground rod clamps should be rechecked after driving to ensure they still fit tightly. If not, re-clamping will be necessary.

M. Record Keeping & Reporting

Pole treating records shall be completed by the contractor, legibly for each pole inspected and/or treated. A Company supplied report form shall be used (Exhibit 2). Treated poles shall be marked on the pole maps. Completed pole maps shall be given to the district or at the districts option returned to the EDE Forester. Incomplete pole maps/project areas shall be returned to the EDE Forester.

A separate record shall be provided to EDE Forester summarizing reject and danger poles (Exhibit 3). Prior to pole replacement, line crews should double check the pole identified on the list by making sure the pole (in the field) has either 2 square aluminum tags (identifying a danger pole) or 1 square aluminum tag (identifying a reject pole) nailed to the pole.

There are other items that may need followup in the field which were identified by the contractor and noted in the remarks column of the Wood Pole Inspection and Treating Report (e.g., pole class change, broken insulators, etc.).

A district work unit summary shall be provided to EDE Forester at the completion of each project area.

Important: It is imperative that all data recorded be accurate. Incomplete or inaccurate data shall be remedied by the contractor at no additional expense to the Company, or the Company will remedy the problem and deduct the cost from the contractor invoice.

N. Incidental Work

The time and material rate adopted under the terms of this contract will be utilized in determining compensation to the contractor for work performed beyond the scope of this project. Such work will be done only upon the authorization of the EDE Forester. All equipment prices include the cost of standard tooling as utilized by the contractor on the unit-price bid proposals.

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O. Contractor Employees

Pole inspectors or crew foremen performing the work shall be trained and experienced in the inspection and treatment of wood poles. Supervision of pole inspectors or crew foremen shall be performed by the contractor using experienced supervisors with a minimum of two years experience in pole inspection and treatment and available on a full-time basis if a situation requires it.

Contractor employees are to be properly groomed and neatly dressed in clothing appropriate for the work with shirts or other outside visible means that clearly identifies the contractor's name.

Copies of this specification are to be provided for contractor employees. Pole inspection crew foremen and supervisors of the work are required to have a copy and be familiar with the specification and its requirements prior to the time when work begins and to have a copy with each crew location.

P. Vehicle Requirements

All contractor vehicles on Company property must be clearly identified with contractor name. Contractor vehicles must comply with all DOT regulations.

Q. Quality Control

At the Company's option, completed work may be inspected at any time by WPSC authorized representative and the contractor's representative. This quality control check field check is intended to satisfy the Company of the proper performance of work according to the specification and is not intended to substitute for careful supervision by the contractor's own personnel.

Any discrepancies will be brought to the attention of the contractor and corrective action, satisfactory to the Company, shall be taken by the contractor to remedy the situation before the next quality control check. The corrective action may include, but is not limited to, reinspecting and retreating each pole back to the previous quality control check point at no cost to the Company.

R. Adjusting Complaints or Damage Claims

Complaints or damage claims of any nature received from property owners or those in authority shall receive immediate attention (within 3 working days) by the contractor. All such complaints or damage claims shall be reported immediately to the Company.

It is understood that the contractor does not represent the Company and has no authority to obligate the Company for any payment or benefit of any kind to any person.

The contractor shall not make any payments to property owners, local inspectors or other persons for any right to inspect or treat wood poles except on written approval of the Company.

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S. Accidents

Any accidents involving WPSC facilities, public or private property, other individuals, etc., shall be reported immediately to the Company. The Company shall receive, within three (3) working days, a written report of the accident from the contractor's supervisor. The report shall include but not be limited to the accident; location, date, time, description, witnesses, and corrective actions taken to avoid future occurrences. The report shall be turned in to the Company's District Manager with a copy to the EDE Forester.

T. Payment

The Company requires invoices on an as-completed basis, by district.

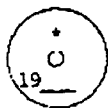
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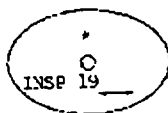
Exhibit 1

TAGGING REQUIREMENTS

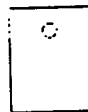
1. External Treated



4. Inspected (Sound and Bore -  
Partial Excavation) - Not  
Externally or Internally  
Treated



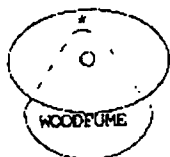
7. Reject - Pole Does Not Meet  
Strength Requirements and  
Should Be Replaced



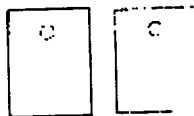
2. Woodfume & External  
Treated



5. Inspected and Woodfume  
Treated



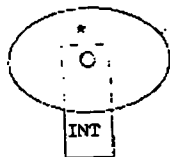
8. Danger - Pole Does Not  
Meet Strength Requirements.  
Shall Not Be Climbed, and  
Should Be Replaced As Soon As  
Possible



3. External Treated and Internal  
Treated



6. Inspected and Internal  
Treated



\*Contractor's Name or  
Abbreviation  
(19 Indicates Year of Inspection)

WPSC - Preventative Maintenance Plan  
Section: Pole Inspection and Treatment

Chapter 2 - Distribution

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**Exhibit 2**

**WOOD POLE INSPECTION AND TREATMENT REPORT**

WISCONSIN PUBLIC SERVICE CORP.

DISTRICT \_\_\_\_\_ MUNICIPALITY \_\_\_\_\_  
MAP NUMBER \_\_\_\_\_ CONTRACTOR \_\_\_\_\_  
EXCAVATED & INSPECTED BY \_\_\_\_\_

DATE \_\_\_\_\_ TOWN/DISTRICT \_\_\_\_\_ POLE NUMBER \_\_\_\_\_ MANUFACTURER \_\_\_\_\_

TYPE OF POLE AND ORIGINAL TREATMENT \_\_\_\_\_ DATE OF POLE MANUFACTURE \_\_\_\_\_  
EFFECTIVE O.L. CIRCUMFERENCE \_\_\_\_\_ ORIGINAL O.L. CIRCUMFERENCE \_\_\_\_\_

EXTERNAL MEASUREMENTS:   
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ALSO NOTE:   
POLE LEAKING \_\_\_\_\_  
CRACKED ARMS \_\_\_\_\_  
CRACKED BRACES \_\_\_\_\_  
BROKEN PINS \_\_\_\_\_  
BROKEN BOLTS \_\_\_\_\_  
C-ARM DAMAGE \_\_\_\_\_  
C-ARM INSULATORS \_\_\_\_\_  
ANY DAMAGE \_\_\_\_\_  
WOUND TO P \_\_\_\_\_  
CLASS DAMAGE \_\_\_\_\_  
REMARKS \_\_\_\_\_

TOTALS THIS SHEET

WOOD TYPE SYMBOLS:   
S.P. - SOUTHERN PINE  
W.L. - WESTERN LARCH  
D.F. - DOUGLAS FIR  
O.C. - CEDAR

ORIGINAL TREATMENT:   
G - GAS PENTA  
X - GAS PENTA  
I - INITIAL TREATMENT  
N - COPPER NAPHENATE

White - Foreman  
Pink - Contractor  
Green - District  
Yellow - Foreman  
Orange - Foreman  
Red - Foreman

WPSC - Preventative Maintenance Plan  
Section: Pole Inspection and Treatment

Chapter 2 - Distribution

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WISCONSIN PUBLIC SERVICE CORPORATION WOOD POLE INSPECTION

Exhibit 3

REJECT & DANGER POLE SUMMARY

Sheet \_\_\_\_ of \_\_\_\_

District \_\_\_\_\_ Year \_\_\_\_\_

#	Town/Range	Pole #	Type of Pole & Original Treatment	Date of Pole Manufacture 19__	Remarks (Use Codes) Reject or Danger
1					
2					
3					
4					
5					
6					
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## **V. DISTRIBUTION LINE CLEARANCE PROGRAM (Tree Trimming)**

### **INSPECTION**

Wisconsin Public Service has an extensive Line Clearance Program. This program consists of inspection, tree trimming efforts, limited spraying efforts (not broadcast spraying), and brushing. This program complies with the requirements of PSC 113.0509 through 113.0512. The basic goal of the program is to maintain, if not improve, the reliability of electric service to our customers.

Attached to this document is a copy of our standard tree-trimming contract. There is extensive effort that goes into the training of our contract personnel on identifying problem trees and how to best trim trees. We also have well-trained individuals on staff that oversee these contracts, deal with customer complaints, and do final inspections of an area to make sure that the terms of the contract are lived up to.

Our basic plan is to trim all urban areas on a four-year cycle and all rural areas on a six-year cycle. There are areas that are on shorter cycles based on local conditions. The basic plan is to do selective spraying in rural areas two years after it has been trimmed (to deal with new sprouts).

We also have a program where conditions that are called in by customers or by our own field personnel are reported. A line crew immediately takes care of items that are ruled as immediate hazards. Other items are turned over to our tree trimming contractor for timely follow up. This follow up occurs within two weeks.

### **CONDITION RATING CRITERIA and CORECTIVE ACTION SCHEDULE**

The criteria for tree trimming are very detailed and laid out in contract form. When the tree trimming crew finds a problem it is usually corrected right away (with proper approvals from the property owner). If we are unable to get permission, it will obviously take a little while to clear through the proper legal channels. Customer calls for specific tree concerns are taken care of immediately if deemed critical. Otherwise, they are normally handled within two weeks.

### **RECORD KEEPING**

We have extensive record keeping on what was done, when an area is scheduled for work, the costs, etc. We also keep track of outages. With the outage statistics reported on our "Distribution Unusual Occurrence Reports", we can check to see how our tree trimming is doing in relation to reliability.

### **SUPPORTING DOCUMENTATION**

Exhibit A: WPSC Line Clearance Contract Specifications

Exhibit B: A table showing project areas and trimming and spraying cycles.

Exhibit A

**WISCONSIN PUBLIC SERVICE CORPORATION  
1999-2000 TIME AND MATERIAL LINE CLEARANCE CONTRACT  
SPECIFICATION NO. WPSC-CR-009**

**DIVISION I - GENERAL REQUIREMENTS:**

101. COMPANY Wisconsin Public Service Corporation

102. NAME OF PROJECT Line Clearance Project

103. LOCATION OF PROJECT WPSC's Central Region

104. SCHEDULE OF WORK

104.1 Start: May 1, 1999

104.2 Complete: December 31, 2000

105. SCOPE OF WORK

Provide labor, equipment, tools, materials and supplies to perform line clearance/right-of-way maintenance work as requested by Wisconsin Public Service Corporation.

106. WISCONSIN SALES AND USE TAX

This specification is for line clearance in the Wisconsin Public Service - Service Territory and is exempt from Wisconsin sales and use tax because it is a nontaxable service. Therefore, the following sales/use tax message is applicable to this specification.

Wisconsin Sales/Use Tax Notice - Do not bill sales/use tax. This purchase order covers a nontaxable service.

107. SPECIAL CONDITIONS

When raptor nesting areas are identified near line clearance operations, contact the System Forester for proper permits and work practices to be followed.

WISCONSIN PUBLIC SERVICE CORPORATION

DIVISION 2 - MAPS AND SUPPLEMENTS

201.0 MAPS

202.0 SUPPLEMENT

The contractor's attention is directed to the following supplemental documents which are attached hereto and form a part hereof:

- 202.1 Exhibit A - WPSC Line Clearance Notification Record Instructions
- 202.2 Exhibit B - Primary Clearing Requirements, Rural Sites
- 202.3 Exhibit C - Primary Clearing Requirements, Residential Sites
- 202.4 Exhibit E - WPSC Weekly Operation Report
- 202.5 Exhibit F - WPSC Contractor Supervisor Weekly Report
- 202.6 Exhibit G - Project Area Work Spreadsheet Summary

DIVISION 3 - TECHNICAL REQUIREMENTS

300. GENERAL

The contractor agrees to perform right-of-way maintenance work on the Wisconsin Public Service Corporation (company) System. It is understood by and between the company and the contractor that 1) The company's gas lines will continue in normal operation 2) The company's electric circuits will continue to operate at voltages up to and including 345 kV through the course of the required work.

The contractor is to provide and use all protective equipment and practices necessary to assure the safety of the contractor, company employees and the general public. As a minimum, ANSI Z133.1 - 1994 (or subsequent revisions) shall be complied with.

The contractor acknowledges and agrees to provide vegetation maintenance crews to the Company strictly as an independent contractor, and that it is solely and directly responsible for all management and supervision of crews, including but not limited to hiring, firing, discipline, work assignment, promotion, wages and benefits.

301. LOCATION OF WORK

The contractor shall obtain from the Company information as to the nature of the project involved in all cases before work is commenced.

302. NOTIFICATION

The contractor shall conduct all necessary notification of property owners involved with the planned work.

302.1. The contractor provides the property owner(s) involved with notification of intent to conduct the required line clearance work. Any line clearance work done without property owner notification must have specific approval of the WPSC System Line Clearance Coordinator. In no case shall the contractor require the property owner to sign off approval for line clearance tree trimming .

302.2. Verbal notification and/or mailed notification of the property owner for routine line clearance work is sufficient. If the property owner is not home, a notification card may be left on the door

Notification cards should not be placed in any U.S. mailboxes. Notification cards are only to be used where the owner is likely to be present on site on a regular basis. (The notification card used shall be company-approved or, at the company's option, be company supplied.) Absentee owners may be notified by mail or by phone. All notification cards and mailings should contain the following: contractor's name, address, and local phone number.

In the case of the industrial, municipal, county, state or large private estate type properties, the City Forester/Arborist, the caretakers or other designated individual in the employ of the owner who is responsible for the trees or brush to be cut or trimmed is considered to represent the interest of the owner. Notification to such caretakers or grounds maintenance supervisors or other responsible individual is an acceptable contact.

Any notification by personal contact, notification card or mailing should clearly state the contractor is an independent contractor of WPS hired to trim and remove trees around power lines. The notification should clearly state the line clearance work required and need to maintain proper tree clearance from the power lines is necessary in providing safe, reliable, uninterrupted electrical service.

The Company strives in every way possible to maintain good relations with the public. The actions of the contractor reflect on the Company. Therefore, the contractor should give diligent consideration to the interests of property owners, tenants and the general public, whenever involved, and shall carry out the work in such a manner as to cause a minimum of inconvenience.

302.3. The contractor shall maintain a written daily log of all property owner notification by personal contact, letter, phone call and notification cards. The "WPSC Line Clearance Notification Record" form (Exhibit A) shall be used as log document.

The log shall include:

- a record of the date of initial contact
- owner's name
- address
- method of contact
- site type
- refusal or variance to line clearance specification, WPS initials acknowledging of refusal or variance and reason
- any follow-up conducted
- Date work completed

A copy of this log shall be made and given to the WPSC System Line Clearance Coordinator in charge of line clearance.

302.4. In the case of tree removal, the contractor may request the property owner sign an approval form for tree removal, provided the form is WPSC approved.

### 303. RIGHT-OF-WAY CLEARING REQUIREMENTS

The right-of-way clearing work requirements established by the terms of these specifications are defined by line and site type. Line types include gas lines, transmission lines, transmission lines with distribution underbuild, distribution primary, distribution secondary, and service/street light circuits.

The following are general guidelines establishing desired clearances. In every case the contractor is expected to exercise good judgement in applying these guidelines to field conditions.

RURAL SITES are defined as those sites not having direct association with a permanent or seasonal residence and include right-of-way in areas of agricultural and forest land use. Rural sites are not intensively developed and typically include right-of-way occupied by native vegetative cover types, stocked with naturally occurring plant materials. Undeveloped sites within otherwise urbanized areas and residential neighborhoods are considered rural sites and are to be subject to the appropriate rural clearing requirements.

RESIDENTIAL SITES are defined as those sites in direct association with and in close proximity to permanent and seasonal residences and dwellings. Residential sites include developed lawn areas and other intensively landscaped areas such as business and industrial properties, parks and golf courses. Residential sites include areas where the vegetation is intensively managed, and typically involve yard and street trees of high landscape or ornamental value.

#### 303.1. Gas Lines

Specific direction regarding gas line right-of-way vegetation management practices will be provided by the company to the contractor prior to project start-up.

### 303.2. Transmission Lines

Specific direction regarding transmission right-of-way vegetation management practices will be provided by the company to the contractor prior to project start up.

### 303.3. Transmission Lines With Distribution Line Underbuild - Rural and Residential Sites

The right-of-way clearing zone for transmission/distribution right-of-way extends from fifteen (15) feet below the lowest transmission conductor vertically to twenty (20) feet above the nearest conductor. The clearing zone extends horizontally twenty (20) feet out from the nearest conductor.

Additional clearing may be required to the extent necessary to meet the appropriate distribution circuit clearing requirements. Right-of-way on which past vegetation maintenance practices have established wider limits are to be maintained to the full extent of the previously-maintained width.

### 303.4. Primary Distribution Circuit Right-of-Way - Rural Sites

- The right-of-way clearing zone on rural sites are to be defined by vertical planes on each side of the line ten (10) feet from the outermost conductor(s), the height of which extends from ground to 15 feet above the highest conductor. (Exhibit B)
- The primary clearing zone extends 10 feet, 360 degrees from all equipment energized at primary voltages.
- Trees of all species less than 12" dbh within the clearing limits shall be cut at the stump.
- All Willow (*Salix* spp.), Silver Maple (*Acer saccharinum*), Box Elder (*Acer negundo*), Elm (*Ulmus* spp.), Poplar (*Populus* spp.) Birch (*Betula* spp) and other low density/weak wooded species of any diameter within the clearing limits are to be cut at the stump.

Other species of vigorous, sound trees including Sugar Maple (*Acer saccharum*), Ash (*Fraxinus* spp) and Pine (*Pinus* spp) 12" dbh or greater may be side trimmed back using natural pruning methods to the main stem provided that no branches extend into the ground line cutting zone defined by vertical plane(s) 5 feet from the outer most conductor(s).

Exception: Specimen trees which are unique in regard to their size and location in the right-of-way, judged to be safe and sound may be allowed to remain in the 5 foot zone.

- Primary neutral is treated as secondary conductor as a minimum with primary conductor clearance requirements taking priority. EXCEPTION: When the primary neutral is positioned on a crossarm and the future plans are for two or three phase construction, the clearing zone for the primary neutral is the same as a primary conductor.
- All live branches above the conductors should be removed to a height of 15 feet. All dead branches at any height which overhang the conductor are to be removed.
- Right-of-way on which past vegetation maintenance practices have established wider limits are to be maintained to the full extent of the previously maintained width.
- Trees less than 12" dbh beyond the 10 foot clearing zone are to be removed if trimming to required clearance results in a reduction of more than 40% in live crown area.

- Some trees may have growth characteristics that are observed or judged not to maintain adequate clearance throughout the cycle. These trees should be trimmed with additional clearance to last the full cycle.

### 303.5. Primary Distribution Circuit Right-of-Way - Residential Sites

- The right-of-way clearing zone required on residential sites involving high value yard and street trees of landscape value extends out from primary conductors to a distance of eight (8) feet. All trees/branches extending into the primary clearing zone are to be trimmed to provide at least eight (8) feet of clearance between the conductors and the nearest branch. Vigorous, sound stems or branches 6 inches or greater in diameter, as measured at the point closest to the conductors, more than four (4) feet from the nearest conductor may be allowed to remain (Exhibit C).
- The primary clearing zone extends eight (8) feet, 360 degrees around all equipment energized at primary voltages.
- Primary neutral is treated as secondary conductor as a minimum with primary conductor clearance taking priority. EXCEPTION: When the primary neutral is positioned on a crossarm and future plans are for two or three phase construction, the clearing zone for the primary neutral is the same as a primary conductor.
- Small trees, that cannot be removed, of species capable of height growth into the primary clearing zone that are within fifteen (15) feet of primary conductors should be lightly trimmed to direct future growth away from conductors. If tree is under line, start this trimming as soon as possible.
- Non-continuous residential sites in areas classed as rural should be trimmed by extending the basic clearance zone to 10' of all trees/branches <6" outside 4' zone.
- Some trees may have growth characteristics that are observed or judged not to maintain adequate clearance throughout the cycle. These trees should be trimmed with additional clearance to last the full cycle.
- Small urban areas within a rural project area may have trees with growth characteristics that are observed not to maintain adequate clearance throughout the cycle. These should be revisited at some point in mid-cycle and be trimmed to last the full cycle.
- Sprout growth that results from line clearance trimming practice should not be allowed to grow over primary conductor. This typically is sprout growth associated with conversion of trees that have previously been trimmed in a roundover fashion and converted to natural directional/drop crotch trimming techniques. Sprouts that grow outside the clearance zone and are vertical should be trained to grow at an angle away from the conductors.
- The removal of yard trees of landscape value is permitted to establish required clearances only upon consent of the property owner. The contractor is encouraged to obtain permission for as many take downs as possible that are cost effective.

### 303.6. Secondary Distribution Circuit Right-of-Way - Rural & Residential Sites

The secondary circuit should be trimmed only if contact with tree limbs or branches causes deflection to the line's normal sag.

Secondary circuits include all right-of-way between WPSC-owned pole with transformer and the final WPSC-owned pole.

303.7. Individual Distribution Services and Streetlight Circuits - All Sites

Individual service or street light conductor should be trimmed only if contact with tree limbs or branches causes deflection to the line's normal sag. Services are defined as the span or spans from the last WPSC pole to the customer's meter.

303.8. Guy Wires - All Sites

All trees/branches greater than 2" in diameter contacting guy wires should be trimmed or removed to eliminate the contact.

304. CLEARING METHODS

Trees shall be removed in the most economical manner consistent with public safety and property protection requirements .

All species of trees within the clearing requirements defined in Section 303.1-303.5 of the specifications having the potential for maturing to a height incompatible with overhead lines should be cut leaving a stump 6" or less in height with the following exceptions:

304.1 Screens and barriers should be identified and maintained by trimming.

304.2 Deciduous trees two (2) feet and less in height do not require cutting or herbicide treatment.

304.3 Conifers one foot and less in height do not require cutting or herbicide treatment.

304.4 Sound, vigorous trees of species known to be of strong wood and slow growth may be trimmed provided that the clearance requirements established in Section 303.2-303.8 are met.

304.5 Climbing vines entangling poles and guys should be cut. The cut surface of the severed stem shall be treated with an approved cut surface herbicide application.

305. TRIMMING PRACTICES

Where right-of-way clearing requirements call for tree trimming, the following practices should be followed. (Reference: Pruning Trees Near Electric Utility Lines, By: Dr. Alex L. Shigo)

305.1. Techniques consistent with the practices of natural, lateral and drop crotch trimming shall be utilized.

305.2. Cuts are to be made back to the main stem or to a branch which is at least one third the diameter of the portion being removed. In no case shall deciduous tree limbs be stubbed off at the edge of the clearing limits.

305.3. Wherever possible, all trimming cuts shall be made to direct future growth and sprouting away from the conductors.



- 305.4. Balsam Fir, Spruce, Pine and Northern White Cedar should be trimmed in a natural manner that allows them to retain as much of their natural shape as possible.
- 305.5. All dead branches overhanging primary conductors at any height shall be removed.
- 305.6. A minimum of cuts should be utilized to achieve required clearances.
- 305.7. Where practical, cuts should be primarily restricted to large diameter branches made well within the crown. Shaping through the use of many cuts of small diameter branches in the outer crown should be avoided.
- 305.8. Branch and topping cuts are to be made outside the branch bark collar leaving as small a stub as possible in a manner consistent with natural trimming technique.
- 305.9. Precautions shall be taken to avoid stripping or tearing of bark when cutting large diameter limbs.
- 305.10 Cuts larger than 2 inches diameter shall be treated with tree paint only when specifically requested by the owner to do so.
- 305.11. Where line clearance trimming adversely alters the shape of a tree additional trimming may be done to give the tree satisfactory shape and appearance.
- 305.12. Climbing irons or "hooks" should not be used except in cases involving tree removal work.
- 305.13. All oak trees shall be trimmed according to the oak tree(s) surrounding site type. (Site type is defined in Section 303.)

Rural - Oak trees may be trimmed through the year. All final cuts made on an oak tree from April 15 to July 1 shall be covered with a tree wound dressing.

Residential - Do not trim any oak trees from April 15 to July 1. (Any residential oak tree not trimmed during this period of time: its location shall be recorded and the tree shall be returned to after July 1 for the trimming required.) When emergency oak tree trimming is required all final cuts in this time period made shall be covered with a tree wound dressing.

Any tree(s) suspected of having oak wilt shall not be trimmed, at any time, in any location, unless a hazardous situation exists, and rather its condition shall be reviewed with the landowner and a record kept. Record shall contain the following: oak tree(s) location, symptoms, party contacted, briefly what was discussed and date.

EXCEPTION: Since the spread of oak wilt hasn't been observed in Forest, Langlade, Oneida & Vilas Counties, oak tree trimming restrictions would not apply to these counties.

NOTE: Some cities may have ordinances which are more restrictive than this. It is those ordinances in those cities that shall be the observed rule. The location of any oak tree not trimmed under these city ordinances shall be recorded and the tree shall be returned to after the trimming time period restriction for the trimming required.

### 306. SLASH DISPOSAL

The following practices should be utilized in handling disposal of vegetative materials generated by line clearance operations.

**RURAL SITES** - All cut material including tops and stem wood less than 4 inches diameter should be chipped. Chips may be blown on site with permission from land owner. In cases where the ROW is on public land/ROW, permission to blow chips on site is required from the adjacent private property owner. Where chips are blown on site they should be spread evenly with depth not to exceed 4 inches. All wood 4 inches or greater shall be piled in neat windrows on the site. If the property owner requests that wood 4" and greater be cut into 100" lengths or greater, the contractor shall comply. Windrowing of small diameter vegetation is encouraged where the property owner involved is agreeable.

Windrows shall not exceed 3' in depth. A 10' break shall be provided in the windrow every 30'. Slash should not be piled or windrowed immediately adjacent to homes and/or seasonal residences or in areas highly visible from public roads.

Any cherry spp. with foliage attached shall be removed from pasture areas.

**RESIDENTIAL SITES** - All cut material less than 4" in diameter should be removed from right-of-way crossing sites occupied by yard trees of landscape value.

The work site shall be clear of all debris upon completion of required work. No debris should remain on the site overnight.

NOTE: All normal chip dumping locations should be as close to the crew work location as possible for loads that must be dumped during the work day.

## 7. SELECTIVE HERBICIDE APPLICATION

- 307.1. All herbicides shall be applied in accordance with product label and federal and state laws and regulations. Application is done (1) in conjunction with line clearance cycle maintenance and (2) two or three growing seasons following cycle maintenance (depending on cycle length).
- 307.2. Herbicides, rate and application, application technique, carrier and timing of the application used by the contractor are approved by the System Forester.
- 307.3. All herbicide applicators shall be a certified and licensed commercial pesticide applicator by the Wisconsin Department of Agriculture, Trade and Consumer Protection in the right-of-way category.
- 307.4. Methods - The following defines the procedure for each of the specified techniques required. In general, selective herbicide application describes an approach whereby all stems of any species in the right-of-way, which at maturity would have the capability to interfere with overhead electric lines, are treated with herbicide. These species hereafter will be referred to as undesirable species. Those species that because of their growth form do not pose a threat to the security of overhead electric lines are encouraged. These species hereafter will be referred to as desirable species.

### Low Volume (LV) Basal

For undesirable tree species the LV herbicide mixtures shall be applied to the basal portion of the stem including the root collar to a height of 6 to 18 inches above the groundline depending on stem diameter. (A rule of thumb is on stems of less than 3/4" diameter the stem should be treated from the groundline up to 6" to 10"; stems that are 3/4" - 1 1/2" diameter should be treated 10" to 18".)

(Larger diameter stems are tall enough that they ought to be cut and stump treated.)

Section: Distribution Line Clearance Program (Tree Trimming)

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Low Volume (LV) Basal Banding

For undesirable tree species the LV mixture shall be applied to the basal portion of the stem no higher than 3 feet on the stem with a band width of 6 to 18 inches depending on stem diameter. (A rule of thumb is on stems of less than 3/4" diameter the stem should be banded 6" to 10" in width; stems that are 3/4"-1 1/2" diameter should be banded 10" to 18" in width. Larger diameter stems are tall enough that they ought to be cut & stump treated.)

The low volume (LV) herbicide mixture utilized on line clearance herbicide applications for fall/dormant applications - 1 gallon Garlon 4 plus 3 gallons ULV basal oil plus 2 1/2 ounces oil soluble red or blue dye (a 25% Garlon 4 mix).

The LV herbicide application equipment shall include either a backpack or canister sprayer, a special LV basal wand (Example: B & G Extenda-ban drip-proof extension valve with Y-2 tip) shall be used. The nozzle shall be adjusted to produce a fine-coarse mist. A fog or solid stream pattern should not be used. In no case will leaking equipment be tolerated.

Low-Volume (LV) Foliar

Will be used as conditions warrant and when specifically approved. Application technique, equipment and herbicide formulation will be tailored to the project.

Cut Surface

Cut stumps and stubble must be treated with an approved cut surface treatment within one half (1/2) hour following cutting. Stump treatment applications shall be made using twenty-five percent Garlon 4 in LV basal oil if applied around the entire remaining bark and any exposed roots.

- Applications should not occur when precipitation is sufficient to cause wetting of undesirable tree stems or stumps.

307.5. Each vehicle used for or transporting chemicals shall be equipped with a shovel and absorptive material for controlling a spill. All chemical spills shall be reported immediately to the Company and required governmental authority.

307.6. Chemical concentrate when left unattended shall be stored in locked compartments.

307.7. Spray equipment should not be left unattended within 100 feet of any water body or wetland.

307.8. All herbicide applications shall be made by applicators walking the right-of-way.

307.9. The contractor shall comply with the State pesticide application record keeping requirements. This record shall contain the following:

- Name(s) of person(s) applying the herbicide.
- Location of the site where the pesticide was applied.
- The date and time of the herbicide application.
- The trade name of the herbicide applied and either the manufacturer name or the herbicide product's EPA registration number.

Section: Distribution Line Clearance Program (Tree Trimming)

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- The amount of herbicide used and the area treated.

Record must be filled out on the day of the application and retained by the contractor for two years.

A copy of this record shall be made and given to the System Line Clearance Coordinator in charge of line clearance.

### 307.10 Restrictions

Specific conditions in which herbicide applications are not to be made:

- Where prohibited by label instructions.
- Where a property owner specifically requests no herbicides.

### 308. NATURAL LOW-GROWING SPECIES

Low-growing shrubs which will not interfere with the power line should not be cut or chemically treated.

EXCEPTION: On rural sites a 5 foot radius circle at each pole should be cleared of all woody vegetation. On rural cross country right-of-way a 5 foot strip at center line in addition to a 5 foot radius circle at each pole should be cleared of all woody vegetation. No herbicide treatment of the stumps and stubble of the low-growing species is required.

Tag Alder, Sumac and Shrub Willow growing to a height within 8' of primary conductors on rural sites should be removed, or within 3' of secondary conductor they will be trimmed or removed to secondary conductor clearance requirements.

### 309. DANGER TREES

Identifying danger trees requires good judgement. Trees that are leaning or weakened due to mechanical damage, root loss, soil disturbance or disease or dead trees outside of the clearance requirements established and pose a threat to the adjacent electric facilities, should be identified and determined whether the tree(s) should be removed.

### 310. ADJUSTING COMPLAINTS OR DAMAGE CLAIMS

Complaints or damage claims of any nature received from property owners of those in authority over trees removed, trimmed or sprayed shall receive immediate attention (within 3 working days) by the contractor and shall be promptly adjusted. All such complaints or damage claims shall be reported immediately to the Company whether or not adjusted.

It is understood that the contractor does not represent the Company and has no authority to obligate the Company for any payment or benefit of any kind to any person. The contractor shall not make any payments to local inspectors, property owners or any other persons for any right to trim or remove trees except on written approval of the Company.

311. CREW SIZE AND WORKERS CLASSIFICATION

The Company and contractor shall determine the size of the crews and classification of labor categories which shall be assigned by the contractor to do the work in the Company Region's operating districts. Crew size and composition shall not be changed by the contractor without the consent of the Company. The classification of the contractor's employees may be determined by mutual agreement between the contractor and Company. The Company will not accept automatic progression of labor. Specific approval of changes in labor classification is required.

312. EMPLOYEES

Contractor employees are to be properly groomed and neatly dressed in clothing appropriate for the work with shirts that clearly identify the contractor's company name.

The contractor shall employ only competent employees and, at the request of the Company, shall remove from the work any employee who, in the opinion of the Company, is deemed incompetent, untrustworthy, disorderly, or otherwise violates the terms of this contract.

313. LABOR AND EQUIPMENT RATES

The Company shall pay the hourly rate specified in the "Schedule of Rates" for the actual hours worked on: new construction, other work orders, request, gas right-of-way, transmission right-of-way and any work other than line clearance maintenance. For this type of work crew time shall start and end at the job headquarters. The job headquarters may be changed weekly and should be located near the job site. Rates include all charges of the contractor against the Company on account of work, labor or services rendered by the contractor hereunder or on account of equipment, materials or supplies used in connection with the work, including without being limited to all charges for insurance, overhead expense, administration, transportation, maintenance, licenses and permits. Supervisory requirements and billable cost are defined in Section 314 of these specifications.

314. SUPERVISION

(This duty list does not address a line clearance contractor's own need for crew safety training or equipment safety on the job. This safety training is determined and provided for by the contractor following all applicable state/federal rules and regulations.)

Provide:

- Weekly consultation with WPSC System Line Clearance Coordinator in charge of line clearance operations in the following areas:
  - 1) Crew(s) start-up & shut down
  - 2) Crew(s) location
  - 3) Crew(s) progress/productivity
  - 4) Work quality (adherence to specifications)
  - 5) Crew(s) and/or equipment changes or recommendations for changes
- Periodically check accuracy of all records and reports sent to WPSC
- Help crew(s) plan ahead, provide realistic expectations/goals

Section: Distribution Line Clearance Program (Tree Trimming)

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- Identify training need as applicable to WPSC specifications and consult with WPSC System Line Clearance Coordinator and System Forester.
- Document General Foreman work activities each week (Exhibit F)

Time that General Foreman spends with crews during billable crew hours to WPSC shall not include:

- Union or personnel related business
- Equipment repair or inspection or maintenance involving shut down
- Any other unrelated activity not directly associated with WPSC requirements

### 315. REPORTING

The contractor shall report to the Wisconsin Public Service representative. The following activities are included:

- Prior notification of work start up, adding or changing crews.
- The contractor shall arrange for daily consultation with the Company representative or at other intervals as the Company representative may request.
- Complete on a daily basis the "WPSC Weekly Operation (Line Clearance) Report" for each crew. (Exhibit E)
- Complete on a daily basis the "WPSC Contractor Supervisor Weekly Report" (Exhibit F) detailing the activities of each contractor-provided supervisor.
- Complete on a monthly basis a Project Area Maintenance Work Spreadsheet Summary. The spreadsheet summary(s) shall show work completed by crew in the units found on the WPSC Weekly Line Clearance Report. A summary of all crews' work in a project area shall also be provided. (Exhibit G)
- The crew foreman shall maintain an up-to-date log of all property-owner notification by personal contact, phone call, letter or notification card. A copy of this log shall be made and given to the System Line Clearance Coordinator. (Section 302.3)
- The contractor is required to meet on a 6-month basis (or as required by the Company) with appropriate Company representatives to assess quality, efficiency, productivity, performance factors, and meeting the requirements of the division, including but not limited to target schedules, regularly scheduled project area work and emergency work.

### 316. ACCIDENTS

Any accidents involving WPSC facilities shall be reported immediately to the Company. The Company shall receive within three (3) working days a written report of accident from the contractor's supervisor. The report shall include but not be limited to the accident; location, date, time, description, witnesses and corrective actions taken to avoid future occurrence. The report shall be turned in to the WPSC System Line Clearance Coordinator and appropriate site leader, with a copy to the System Forester.

17. MATERIALS

The contractor shall supply herbicides utilized in the vegetation maintenance program on an as used basis at the rates adopted under the terms of this agreement.

318. DEFINITION OF EQUIPMENT

The contractor shall service and maintain all equipment in excellent operating condition. Equipment must have a neat appearance and must clearly identify the contractor's company name. Servicing and maintenance shall be carried out on the contractor's own time at his expense.

The Company reserves the option to demand replacement of any equipment which, in the opinion of the Company, has a poor operational record. The contractor shall keep a log of all equipment breakdowns and be prepared to present copies at the quarterly review.

**Section: Distribution Line Clearance Program (Tree Trimming)**

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**TRIM LIFT BUCKET** - The standard tree trimming truck shall be a hydraulic bucket truck with at least 50-foot platform height. The truck shall have a dump box for chips. Each truck shall, at a minimum, carry the following equipment:

- 1 Hydraulic Pole Pruner (when required for shaping of conifers)
- 1 Hydraulic Stick Saw
- 1 Extension Ladder
- 2 Gas Powered Chain Saws (one chain saw may be substituted with a brush saw)
- 1 Manual Pole Saw
- 1 Manual Pole Pruner
- Chemical Application Equipment
- 2 Sets Climbing Gear (Hooks, Saddles, Climbing Ropes and Handlines)
- 1 Bull Rope

**ALL WHEEL DRIVE TRIM LIFT BUCKET** - 4 x 4 or 6 x 6 wheel drive trucks with hydraulic lift and dump box may be utilized in some locations as requested by the Company. The trucks shall carry at least the same equipment complement specified for the standard trim lift buckets.

**OFF ROAD TRIM LIFT BUCKET** - A hydraulic lift mounted on a vehicle capable of traversing difficult terrain (i.e., skidder, forwarder, tracked vehicle). The rig shall carry a complement of equipment including at least those items specified under the standard trim lift bucket.

**ROW VEHICLE** - The company may require a support vehicle in some locations. This vehicle shall be maintained in neat, presentable condition. The vehicle may be a car, pickup or 4 x 4 pickup.

**SPLIT BOX DUMP** - This vehicle shall be a 2-ton truck fitted with a chip dump box.

**MANUAL CREW SPLIT BOX DUMP** - This vehicle shall be a 2-ton truck fitted with a chip dump box. The truck shall, at a minimum, carry the following equipment:

- 2 Gas Power Saws, 12 inch bar
- 1 Gas Power Saw, 16 or 20 inch bar
- Sledge Hammer and 2 Wedges
- 1 Cant Hook
- 1 Timber Carrier
- 1 20-foot Extension Ladder
- 2 Manual Pole Saws
- 2 Manual Pole Pruners
- Chemical Application Equipment
- 2 Sets Climbing Gear (Hooks, Saddles, Climbing Ropes and Handlines)
- 1 Bull Rope
- 1 Double Block and Tackle With Line

**BRUSH CHIPPER** - A standard brush chipper trailer with an intake throat and knives at least 12" in length, an output chute capable of directing the blown chips and a power source with at least 4 cylinders.

**4 x 4 SPRAY TRUCK** - Same as standard spray truck (7a) except has the capability of 4-wheel drive.



Section: Distribution Line Clearance Program (Tree Trimming)

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**LOW VOLUME SPRAY TRUCK** - A pickup truck equipped to make low volume basal applications, including 2 back k/hand tank sprayers equipped with "Spraying Systems" Model 23L-7676 ULV wands, 5500 nozzle and Y-2 tip, funnels and a suitable container of at least 5 gallons for mixing. The truck shall also be equipped with spill containment materials including shovels, broom and absorptive material. There shall be some method of securing all chemicals in locked storage when the vehicle is unattended.

**4 x 4 LOW VOLUME SPRAY TRUCK** - Same as standard low volume spray truck (7c) except has capability of 4-wheel drive.

**319. ESTIMATION OF WORK**

The contractor shall provide estimation of line clearance work for road moves, adding of conductors, line extensions, etc., as requested by district personnel. All of this work estimation, travel, and line clearance shall be billed separately and not be a part of any billing associated with maintenance cycle clearance.

## Section: Distribution Line Clearance Program (Tree Trimming)

### Schedule of Labor Rates State of Wisconsin

The Company shall pay the contractor for labor and equipment after completion and acceptance of the work by the Company in accordance with the following rates. This schedule, effective \_\_\_\_\_ through \_\_\_\_\_, supersedes all provisions, schedules and is to be attached to and become part of the agreement to perform services between Wisconsin Public Service Corporation and \_\_\_\_\_.

Contractor Supervisor (S1) \$ \_\_\_\_\_ per hour  
 Contractor General Foreman (S2) \$ \_\_\_\_\_ per hour

<u>Labor Classification</u>	<u>Actual Payroll Rate</u>	<u>Straight Time</u>	<u>Time and One-Half</u>	<u>Double Time</u>
Foreman, Top (F1)	_____	_____	_____	_____
Foreman (F2)	_____	_____	_____	_____
Climber, Top (C1)	_____	_____	_____	_____
Climber (C2)	_____	_____	_____	_____
Climber (C3)	_____	_____	_____	_____
Climber (C4)	_____	_____	_____	_____
Climber (C5)	_____	_____	_____	_____
Climber (C6)	_____	_____	_____	_____
Groundman, Top (G1)	_____	_____	_____	_____
Groundman (G2)	_____	_____	_____	_____

Material

Pathway (specify unit) \_\_\_\_\_  
 Banvel CST(specify unit) \_\_\_\_\_  
 Garlon 4 (specify unit) \_\_\_\_\_  
 Garlon 4, 25% Premix, (specify unit & carrier) \_\_\_\_\_  
 Other (specify) \_\_\_\_\_  
 Androc Low Volume  
   Basal Oil(specify unit) \_\_\_\_\_  
 Arborchem Low Volume  
   Basal Oil(specify unit) \_\_\_\_\_  
 Other (specify) \_\_\_\_\_  
 Maintain A (specify unit) \_\_\_\_\_  
 Tree-Hold (specify unit) \_\_\_\_\_

Name of Bidder \_\_\_\_\_

Signature of Bidder \_\_\_\_\_ Date Signed \_\_\_\_\_

**Schedule of Labor Rates  
State of Michigan**

The Company shall pay the contractor for labor and equipment after completion and acceptance of the work by the Company in accordance with the following rates. This schedule, effective \_\_\_\_\_ through \_\_\_\_\_ supersedes all provisions, schedules and is to be attached to and become part of the agreement to perform services between Wisconsin Public Service Corporation and \_\_\_\_\_.

Contractor Supervisor (S1) \$ \_\_\_\_\_ per hour  
Contractor General Foreman (S2) \$ \_\_\_\_\_ per hour

<u>Labor Classification</u>	<u>Actual Payroll Rate</u>	<u>Straight Time</u>	<u>Time and One-Half</u>	<u>Double Time</u>
Foreman, Top (F1)	_____	_____	_____	_____
Foreman (F2)	_____	_____	_____	_____
Climber, Top (C1)	_____	_____	_____	_____
Climber (C2)	_____	_____	_____	_____
Climber (C3)	_____	_____	_____	_____
Climber (C4)	_____	_____	_____	_____
Climber (C5)	_____	_____	_____	_____
Climber (C6)	_____	_____	_____	_____
Groundman, Top (G1)	_____	_____	_____	_____
Groundman (G2)	_____	_____	_____	_____

Material

Pathway (specify unit) \_\_\_\_\_  
Banvel CST(specify unit) \_\_\_\_\_  
Garlon 4 (specify unit) \_\_\_\_\_  
Garlon 4, 25% Premix, (specify unit & carrier) \_\_\_\_\_  
Other (specify) \_\_\_\_\_  
Androc Low Volume  
Basal Oil(specify unit) \_\_\_\_\_  
Arborchem Low Volume  
Basal Oil(specify unit) \_\_\_\_\_  
Other (specify) \_\_\_\_\_  
Maintain A (specify unit) \_\_\_\_\_  
Tree-Hold (specify unit) \_\_\_\_\_

Name of Bidder \_\_\_\_\_

Signature of Bidder \_\_\_\_\_ Date Signed \_\_\_\_\_

## Section: Distribution Line Clearance Program (Tree Trimming)

Schedule of Equipment Rates  
Wisconsin

Equipment	Specific Description	Rate/ Hour
Trim Lift Bucket (50+ feet) (including dump body) (E1)	_____	_____
Trim Lift Bucket (50+ feet) (w/o dump body) (E2)	_____	_____
All Wheel Drive Trim Lift Bucket (Spec Type) (E3)	_____	_____
Off Road Trim Lift (Spec Type) (E4)	_____	_____
ROW Vehicle: (Car/Jeep) (E5)	_____	_____
(1/4 ton pickup) (E6)	_____	_____
(Standard pickup) (E7)	_____	_____
(4 x 4 Pickup) (E8)	_____	_____
Split Box Dump (E9)	_____	_____
Manual Crew Split Box Dump (E10)	_____	_____
4 x 4 Spray Truck (E11)	_____	_____
12" Chipper (E12)	_____	_____
Chain Saw (Specify Type Size) (E13)	_____	_____
(E14)	_____	_____
(E15)	_____	_____
Brush Saw (E16)	_____	_____
LV Back Tank (E17)	_____	_____
LV Hand Held Canister (E18)	_____	_____
Small Crawler Tractor (E19)	_____	_____
Mechanical Mowing Machine (E20)	_____	_____
Low Volume Spray Truck (E21)	_____	_____
4 x 4 Low Volume Spray Truck (E22)	_____	_____
Tractor, Mini (E23)	_____	_____
Other (specify)	_____	_____

Name of Bidder \_\_\_\_\_

Signature of Bidder \_\_\_\_\_ Date Signed \_\_\_\_\_

EXHIBIT A

**Wisconsin Public Service Corporation  
Line Clearance Notification Record Instructions**

General

The WPSC Line Clearance Notification Record is intended for use by line clearance contractors working on fixed price bid work or time and material work. This record shall be maintained on a daily basis of all property owner notifications made. This log shall be maintained by line clearance project area. A copy of this log shall be made and given to the WPSC district supervisor in charge of line clearance.

For routine notification, the following numbered items (1-6) shall be completed in the corresponding space provided on the Line Clearance Notification Record, white form, WPS Form No. 159-2091.

1. Date: Enter the date notification takes place. Month/Day/Year
  2. Property Owner Name: (If a rental, indicate owner's name in parentheses).
  3. Property Owner's Address: (If a rental, indicate owner's address in parentheses and indicate job site address outside parentheses).
  4. Contact Type: Place an "x" by type used. In the case of "other," describe.
  5. Site Type Urban or Rural: Place an "x" by type.
  6. Work Completed: Enter the date job was completed. Month/Day/Year
- 

If a refusal or variance occurs, use the yellow form, WPS Form No. 159-2095 (instead of the white form) and complete the items 1-6 above and 7-10 listed below:

7. Refusal or Variance: Place an "x" by either, if occurs. Any work done that does not meet specification requirements – represents a refusal, exceeds specification requirement – represents a variance, must be described here with the closes Pole Number noted. (Prior to any work proceeding, the WPS district supervisor in charge of line clearance must have knowledge of the refusal or variance.)
8. WPS Initials: Initial of WPS district supervisor signed initials acknowledging refusal/variance and date signed. Month/Day/Year
9. Reason: Explanation of refusal/variance.
10. Follow-Up: Corrective action to refusal and date action was taken. Month/Day/Year

Notifier's name shall be written in the lower right corner when each day is over or when the form is filled.

# W - Preventative Maintenance Plan

## Part 2 - Distribution

### Section: Distribution Line Clearance Program (Tree Trimming)

#### Exhibit B

District	Project Area	Rural/Urban	Area Description	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Legal Entity
CH	2	R	Stockbridge Township		Spray	Cycle Breaker Spray	Trim		Spray	Cycle Breaker Spray	Trim		Spray	WPS
CH	4	R	Quinney	Trim				Trim				Trim		WPS
CH	5	R	Potter	Cycle Breaker Spray	Trim	Spray		Cycle Breaker	Trim	Spray		Cycle Breaker	Trim	WPS
CH	7	R	Hilbert/Forest Junction	Spray	Cycle Breaker	Trim			Cycle Breaker Trim	Trim		Cycle Breaker Trim	Trim	WPS
CH	1	U	Village of Stockbridge			Trim								WPS
CH	3	U	Chilton		Trim	Trim		Trim			Trim			WPS
CH	6	U	Brillion		Trim			Trim			Trim			WPS
CH	8	U	Reedsville		Spray			Trim			Trim			WPS
GB	1	R	Pulaski	Trim	Trim	Trim	Trim	Trim	Spray		Spray	Trim	Spray	WPS
GB	2	R	Suamico	Spray	Trim			Spray	Trim		Trim	Spray	Trim	WPS
GB	3	R	Hobart	Spray		Trim	Trim	Spray	Spray	Trim	Trim	Spray	Spray	WPS
GB	4	R	Lawrence, Wrightstown	Spray	Spray	Trim	Trim	Spray	Spray	Trim	Trim	Spray	Spray	WPS
GB	5	R	Dykesville	Spray	Spray	Trim	Trim	Spray	Spray	Trim	Trim	Spray	Trim	WPS
GB	6	R	Scott	Spray	Trim									WPS
GB	7	R	Green Leaf, E. Wrightstown	Spray	Trim	Spray	Trim	Spray	Trim	Spray	Trim	Spray	Trim	WPS
GB	8	R	Glenmore, Shirley, Town of Denmark	Trim		Spray	Trim	Trim	Spray			Trim		WPS
GB	10	R	Denmark Township	Trim	Spray	Spray	Trim	Trim	Spray	Spray	Trim	Trim	Spray	WPS
GB	11	R	Humbolt, Poland	Trim	Spray	Spray	Trim	Trim	Spray	Spray	Trim	Trim	Spray	WPS
GB	13	R	Abrams	Trim	Spray	Spray	Trim	Trim	Spray	Spray	Trim	Trim	Spray	WPS
GB	14	R	Lark, Morrison, Town of Denmark	Trim	Trim	Spray	Trim	Trim	Spray	Spray	Trim	Trim	Spray	WPS
GB	15	R	Askeaton, south Greenleaf	Spray	Cycle Breaker	Trim			Cycle Breaker	Trim		Cycle Breaker	Trim	WPS
GB	1	U	Henis-ra Park west of 41		Trim			Trim			Trim			WPS
GB	2	U	Dousman, I-43, Taylor, Gray	Trim	Trim			Trim			Trim			WPS
GB	3	U	Gray, I-43, Dousman, Fox River	Trim	Trim			Trim			Trim			WPS
GB	4	U	Dousman, Mason, Taylor, Fox River	Trim	Trim			Trim			Trim			WPS
GB	5	U	Mason, 9th, Taylor, Fox River	Trim	Trim			Trim			Trim			WPS
GB	6	U	Taylor, 9th, Fox River, Lombardi	Trim	Trim		Trim		Trim	Trim		Trim	Trim	WPS
GB	7	U	Lombardi, Fox River, Packerland, Hwy 172 - Ashwabenon North	Trim	Trim			Trim			Trim			WPS
GB	8	U	Fox River, I-43, Elizabeth, E. Mason	Trim	Trim		Trim			Trim			Trim	WPS
GB	9	U	Fox River, E. Mason, East River, McCormick	Trim	Trim		Trim			Trim			Trim	WPS
GB	10	U	Fox River, East River, McCormick, Hwy 172 - North Allouez	Trim	Trim		Trim			Trim			Trim	WPS

# W1 - Preventative Maintenance Plan

## Chapter 2 - Distribution

### Section: Distribution Line Clearance Program (Tree Trimming)

GB	11	U	Elizabeth, University, Green Bay, Humboldt Rd, I-43- (Schmitt Park, Bay Beach)	Trim	Trim	Trim	Trim	Trim	WPS
GB	12	U	University, I-43, Main, Green Briar	Trim	Trim	Trim	Trim	Trim	WPS
GB	13	U	East River, Deckner, Main, East Mason	Trim	Trim	Trim	Trim	Trim	WPS
GB	14	U	Howard	Trim	Trim	Trim	Trim	Trim	WPS
GB	15	U	Ashwabenon South	Trim	Trim	Trim	Trim	Trim	WPS
GB	16	U	West Depere	Trim	Trim	Trim	Trim	Trim	WPS
GB	17	U	South Allouez	Trim	Trim	Trim	Trim	Trim	WPS
GB	18	U	East Depere	Trim	Trim	Trim	Trim	Trim	WPS
GB	19	U	Village of Denmark	Trim	Trim	Trim	Trim	Trim	WPS
KE	1	R	Stangelville	Spray	Spray	Spray	Spray	Spray	WPS
KE	2	R	Norman	Trim	Trim	Trim	Trim	Trim	WPS
KE	3	R	East Denmark	Trim	Trim	Trim	Trim	Trim	WPS
KE	4	R	Footbridge	Spray	Spray	Spray	Spray	Spray	WPS
KE	8	R	Walhain	Cycle Breaker	Cycle Breaker	Cycle Breaker	Cycle Breaker	Cycle Breaker	WPS
KE	10	R	Alaska lake	Spray	Spray	Spray	Spray	Spray	WPS
KE	11	R	Windmills	Spray	Spray	Spray	Spray	Spray	WPS
KE	12	R	NW Algoma	Spray	Spray	Spray	Spray	Spray	WPS
KE	5	U	South Kewaunee	Trim	Trim	Trim	Trim	Trim	WPS
KE	6	U	North Kewaunee	Trim	Trim	Trim	Trim	Trim	WPS
KE	7	U	Luxenberg	Trim	Trim	Trim	Trim	Trim	WPS
KE	9	U	Casco	Trim	Trim	Trim	Trim	Trim	WPS
MA	1	R	Stiles MA	Trim	Trim	Trim	Trim	Trim	WPS
MA	3	R	Coleman MA	Trim	Trim	Trim	Trim	Trim	WPS
MA	5	R	Bayshore MA	Trim	Trim	Trim	Trim	Trim	WPS
MA	6	R	Porterfield MA	Trim	Trim	Trim	Trim	Trim	WPS
MA	8	R	Wagner MA	Trim	Trim	Trim	Trim	Trim	WPS
MA	9	R	McCallister MA	Trim	Trim	Trim	Trim	Trim	WPS
MA	10	R	Peshigo Rural MA	Spray	Spray	Spray	Spray	Spray	WPS
MA	11	R	Marinette MA	Trim	Trim	Trim	Trim	Trim	WPS
MA	12	R	Oconto Rural MA	Trim	Trim	Trim	Trim	Trim	WPS
MA	2	U	Oconto MA	Trim	Trim	Trim	Trim	Trim	WPS
MA	4	U	Peshigo MA	Trim	Trim	Trim	Trim	Trim	WPS
MA	7	U	Marinette MA	Trim	Trim	Trim	Trim	Trim	WPS
MA	13	U	Marinette MA	Trim	Trim	Trim	Trim	Trim	WPS
ME	3	R	Ingalls ME	Trim	Trim	Trim	Trim	Trim	WPS
ME	4	R	Wallace ME	Trim	Trim	Trim	Trim	Trim	WPS
ME	5	R	Stephenson ME	Trim	Trim	Trim	Trim	Trim	WPS
ME	1	U	Menominee ME	Trim	Trim	Trim	Trim	Trim	WPS
ME	2	U	Menominee ME	Trim	Trim	Trim	Trim	Trim	WPS
SB	1	R	Neuren	Trim	Trim	Trim	Trim	Trim	WPS
SB	2	R	Kolberg	Trim	Trim	Trim	Trim	Trim	WPS

W1 - Preventative Maintenance Plan

Chapter 2 - Distribution

Section: Distribution Line Clearance Program (Tree Trimming)

SB	3	R	Stevenson pier	Trim	Trim	Cycle Breaker	Cycle Breaker	Trim	Cycle Breaker	Trim	WPS
SB	4	R	Bayshore	Trim	Trim	Cycle Breaker	Cycle Breaker	Trim	Cycle Breaker	Trim	WPS
SB	5	R	Institute/Valmy	Trim	Trim	Cycle Breaker	Cycle Breaker	Trim	Cycle Breaker	Trim	WPS
SB	6	R	Egg harbor	Trim	Trim	Cycle Breaker	Cycle Breaker	Trim	Cycle Breaker	Trim	WPS
SB	7	R	Juddville	Cycle Breaker	Trim	Spray	Spray	Trim	Spray	Cycle Breaker	WPS
SB	8	R	Fish Creek	Cycle Breaker	Trim	Spray	Spray	Trim	Spray	Cycle Breaker	WPS
SB	9	R	Jacksonport	Cycle Breaker	Trim	Spray	Spray	Trim	Spray	Cycle Breaker	WPS
SB	10	R	Bailys Harbor	Cycle Breaker	Trim	Spray	Spray	Trim	Spray	Cycle Breaker	WPS
SB	11	R	Ridges	Cycle Breaker	Trim	Spray	Spray	Trim	Spray	Cycle Breaker	WPS
SB	12	R	Peninsula State Park	Cycle Breaker	Trim	Spray	Spray	Trim	Spray	Cycle Breaker	WPS
SB	13	R	Sister Bay 2	Spray	Cycle Breaker	Trim	Trim	Trim	Trim	Cycle Breaker	WPS
SB	14	R	Rowleys Bay	Spray	Cycle Breaker	Trim	Trim	Trim	Trim	Cycle Breaker	WPS
SB	15	R	Ellison Bay 2	Spray	Cycle Breaker	Trim	Trim	Trim	Trim	Cycle Breaker	WPS
SB	16	R	Newport Bay	Trim	Spray	Trim	Cycle Breaker	Trim	Trim	Trim	WPS
SB	17	R	Garrett Bay	Trim	Spray	Trim	Cycle Breaker	Trim	Trim	Trim	WPS
SB	18	R	North Port De Mort	Trim	Spray	Trim	Cycle Breaker	Trim	Trim	Trim	WPS
SB	19	U	Ephraim	Trim	Trim	Trim	Trim	Trim	Trim	Trim	WPS
SB	20	U	Sister Bay	Trim	Trim	Trim	Trim	Trim	Trim	Trim	WPS
SB	21	U	Fish Creek	Trim	Trim	Trim	Trim	Trim	Trim	Trim	WPS
SB	22	U	Gills Rock	Trim	Trim	Trim	Trim	Trim	Trim	Trim	WPS
SB	23	U	Egg Harbor	Trim	Trim	Trim	Trim	Trim	Trim	Trim	WPS
SB	24	U	Ellison Bay	Trim	Trim	Trim	Trim	Trim	Trim	Trim	WPS
SB	25	U	Snake Island	Trim	Trim	Trim	Trim	Trim	Trim	Trim	WPS
SB	26	U	Forestville	Trim	Trim	Trim	Trim	Trim	Trim	Trim	WPS
TW	1	R	St. Nazianz	Trim	Spray	Trim	Trim	Trim	Spray	Trim	WPS
TW	2	R	Gas Lake	Trim	Spray	Trim	Trim	Trim	Spray	Trim	WPS
TW	3	R	Valders	Trim	Spray	Trim	Trim	Trim	Spray	Trim	WPS
TW	4	R	Newton	Trim	Spray	Trim	Trim	Trim	Spray	Trim	WPS
TW	5	R	Clarks Mills	Trim	Spray	Trim	Trim	Trim	Spray	Trim	WPS
TW	6	R	West Two Rivers/White Law	Spray	Trim	Trim	Trim	Trim	Trim	Trim	WPS
TW	7	R	Kellnersville	Trim	Cycle Breaker	Trim	Trim	Trim	Cycle Breaker	Trim	WPS
TW	8	R	Shoto	Spray	Cycle Breaker	Trim	Trim	Trim	Cycle Breaker	Spray	WPS
TW	9	R	Maribel	Trim	Cycle Breaker	Trim	Trim	Trim	Cycle Breaker	Trim	WPS
TW	10	R	Mishicot	Trim	Spray	Trim	Trim	Trim	Spray	Trim	WPS
TW	11	R	Point Beach St Park	Trim	Trim	Trim	Trim	Trim	Trim	Trim	WPS
TW	12	R	Tisch Mills	Cycle Breaker	Trim	Trim	Trim	Trim	Spray	Cycle Breaker	WPS



W1 - Preventative Maintenance Plan

Chapter 2 - Distribution

Section: Distribution Line Clearance Program (Tree Trimming)

AN	1	R	towns of upham & summit	Trim	Spray	Trim	Trim	WPS
AN	2	R	towns of neva & price				Spray	WPS
AN	3	R	towns of polar,antigo & norwood	Spray	Trim	Spray	Trim	WPS
AN	4	R	towns of ackley, harrison(nar. ct.)	Spray	Trim	Trim	Spray	WPS
AN	5	R	towns of vilas & peck	Trim			Trim	WPS
AN	1	U	hwy. 45 west				Trim	WPS
AN	2	U	btwn. 5th, 45, parkway 64	Trim			Trim	WPS
AN	3	U	btwn. 5th, forest, parkway, 45	Trim			Trim	WPS
MR	1	R	newwood area	Trim			Trim	Western
MR	2	R	town of coming	Trim			Trim	Western
MR	3	R	town of hamburg	Spray			Trim	Western
MR	4	R	town of scott	Spray			Trim	Western
MR	5	R	town of pine river	Spray			Spray	Western
MR	6	R	hwy. 'c' east of hwy. '17'	Trim			Spray	Western
MR	7	R	gleason	Trim			Trim	Western
MR	8	R	town of merrill	Trim			Trim	Western
MR	9	R	irma	Trim			Trim	Western
MR	1	U	pier street west	Trim			Trim	Western
MR	2	U	pier street-east	Trim			Trim	Western
MR	3	U	wisconsin river-south	Trim			Trim	Western
OS	1	R	picket	Trim			Trim	Central
OS	2	R	lone elm	Trim			Trim	Central
OS	3	R	black wolf	Trim			Trim	Central
OS	11	R	lake butte de morts	Spray			Spray	Central
OS	12	R	winnabago	Cycle Breaker			Cycle Breaker	Central
OS	13	R	clarks point	Trim			Trim	Central
OS	14	R	neenah	Cycle Breaker			Trim	Central
OS	4	U	west oshkosh	Trim			Trim	Central
OS	5	U	airport	Cycle Breaker			Trim	Central
OS	6	U	west river	Trim			Trim	Central
OS	7	U	east river	Cycle Breaker			Trim	Central
OS	8	U	east oshkosh	Trim			Trim	Central
OS	9	U	north river	Cycle Breaker			Trim	Central

# Waukegan - Preventative Maintenance Plan

## Chapter 2 - Distribution

### Section: Distribution Line Clearance Program (Tree Trimming)

OS	10	U	north river	Trim	Cycle Breaker	Trim	Cycle Breaker	Trim	WPS	Central
SP	1	R	dubay	Trim						
SP	2	R	hwy. '10' west & city, 'm'	Trim						
SP	3	R	town of linwood	Trim						
SP	4	R	including hwy. 54 and south	Trim						
SP	5	R	west of inter. 39 and	Spray						
			bancroft	Trim						
SP	6	R	town of almonnd	Spray						
SP	7	R	town of belmont	Trim						
SP	8	R	town of lanark	Trim						
SP	9	R	town of sharon	Spray						
SP	10	R	town of hall	Trim						
SP	1	U	n. of hwy. 10 west of hillshire	Trim						
SP	2	U	s. of 10 btwn. Plover & wis. Rivers	Trim						
SP	3	U	plover west of post rd.	Trim						
SP	4	U	plover east of post road	Trim						
SP	5	U	n. of porter w. of	Trim						
			eisenhower	Trim						
SP	6	U	hwy. 66	Trim						
WA	1	R	town of maine	Spray						
WA	2	R	hwy. 107 e. & n. of hwy.	Spray						
			29	Trim						
WA	3	R	towns of rib falls &	Trim						
			stettin	Trim						
WA	4	R	s. of hwy. 29 & n. of ct.	Spray						
			n	Trim						
WA	5	R	town of rib mountain	Trim						
WA	6	R	town of mosinee	Trim						
WA	7	R	town of marathon	Trim						
WA	8	R	town of cassell & wien	Trim						
WA	9	R	towns of bergen and	Trim						
			knowlton	Trim						
WA	10	R	new yorker	Spray						
WA	11	R	west part of	Spray						
			kronenwetter	Trim						
WA	12	R	east part of kronenwetter	Spray						
WA	13	R	towns of guenther & knowlton	Spray						
WA	14	R	town of reed	Spray						
WA	15	R	town of ringle	Spray						
WA	16	R	towns of hewitt & easton	Trim						
WA	17	R	towns of texas & wausau	Trim						
WA	1	U	btwn. Bridge-falcon-	Trim						
			28th-wis river	Trim						
WA	2	U	btwn. Rib river, 72nd,	Trim						
			wau. Ave, 51	Trim						
WA	3	U	btwn. Wis river, 51,	Trim						
			bridge, lk. Wau	Trim						
WA	4	U	btwn. Wis river, snow bird, lk. Wau	Trim						
WA	5	U	btwn. Wi. Riv, 29, shorey, alderson	Trim						

## Section: Distribution Line Clearance Program (Tree Trimming)

[illegible]

## Chapter 2 – Distribution

## Chapter 2 – Distribution

[illegible]

# W1 - Preventative Maintenance Plan

## Chapter 2 - Distribution

### Section: Distribution Line Clearance Program (Tree Trimming)

WS	6	R	Middle Inlet	Trim	Spray	Spray Trim	Trim	Spray Trim	WPS
WS	7	R	Wausaukee					Spray Trim	WPS
WS	8	R	Reservoir	Spray			Spray Trim		WPS
WS	9	R	Thunder						WPS
WS	13	U	Lenny Civitz Metro	Trim	Spray		Trim	Trim	WPS
WS	10	R	Lenny Civitz Rural	Spray				Spray Trim	WPS
WS	11	R	Noquebay	Trim	Spray		Trim	Spray	WPS
WS	12	R	Beaver	Trim	Spray				WPS

## **VI. DISTRIBUTION INFRARED SURVEYS**

### **INSPECTION**

Wisconsin Public Service has been inspecting its distribution facilities with a portable infrared survey system since 1990. This survey is used to find defective connections, certain pieces of equipment that are failing such as arresters, overloads, etc. By catching these problems in a timely manner, we have been able to improve the reliability of the system.

Each district has a plan as to what gets surveyed. This plan is updated every time that the survey is done. The basic plan is to start at the substation where the distribution feeder starts. We survey the substation itself. Then we survey out on the main line of each distribution feeder to a point where roughly  $\frac{3}{4}$  of the load has been dropped off. Note that it takes load current to show up defective connections. We also pick up key utility feeds to large customers such as hospitals, mills, etc.

The inspections are done in the Eastern and Central Region on the odd years and in the Western and Northern Region on the even years. We also inspect the Green Bay 13.8 kv system and the Harrison Substation feeds to Waupaca Foundry every year. This is because of the extremely high loading on the distribution circuits and because of experience with failures. All of the surveys are done in the summer as close as possible to system peak.

### **CONDITION RATING CRITERIA and CORECTIVE ACTION SCHEDULE**

Any item that is found to be unusual is turned in to be investigated. If the item is found to be critical in nature (very hot spot), the local district is called for immediate repairs. In this case the crew working on the survey works directly with the line crew to check on the problem. If the problem is not of an immediate nature, a report along with color photos of the infrared picture is submitted to the local district for investigation as time permits. Normal response time is 30 days.

### **RECORD KEEPING**

The record keeping consists of the individual reports of problems found in the field. If equipment is found to be defective, the crew turns in the defective equipment with a "Faulty Equipment Report" to Electric Distribution Standards. Also total company and local district statistics are kept on the results of the survey. Unfortunately these statistics need to be updated (behind by two years, the surveys are complete in the field.)

### **SUPPORTING DOCUMENTATION**

Exhibit A: Example of two hot spot reports from Stevens Point

Exhibit B: Sample of statistics on the infrared survey (Antigo, Chilton, Eagle River, Green Bay)

Exhibit A

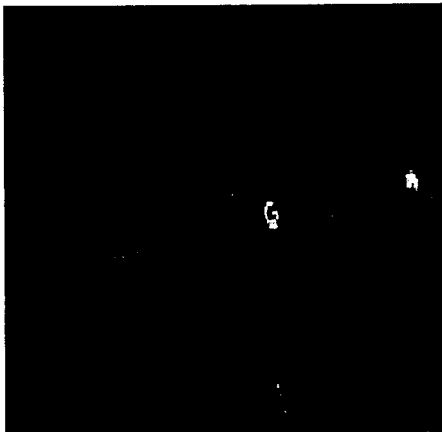

I. THERMOGRAPHIC EXCEPTION REPORT

5. WPSC ELECTRIC DISTRIBUTION SYSTEM

Stevens Point

<b>Report Number</b>	STP-5-00-03	<b>Date</b>	May 22, 2000	<b>Time</b>	15:44
----------------------	-------------	-------------	--------------	-------------	-------

<b>Component Description</b>	Lightning arrestors
<b>Phases</b>	Center & field
<b>Location Number</b>	2208-10-T-210
5. <u>Address</u>	
6. <u>Photo Direction</u>	South
<b>Comments</b>	Inspect/replace arrestors

<div>121 - 118 116 114 111 108 106 103 99.6 96.5 93.2 89.7 86.0 82.1 78.0 73.6 70.0</div> <div></div> <div><b>LAND</b> Date : 05/22/00 Time : 15:44:36 Lens : Norm Window : L 1 Dist : 0 Ft T.Back : 54.7 °F Emiss : 0.50 Atm. : 0.17 % No T °F E</div>	
<b>Thermal Image</b>	<b>Visual Image</b>

Repairs Made:

Exhibit A (Continued)

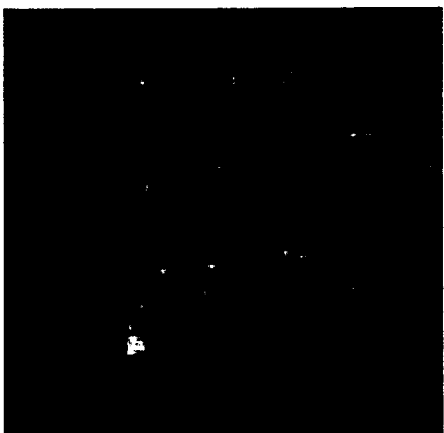
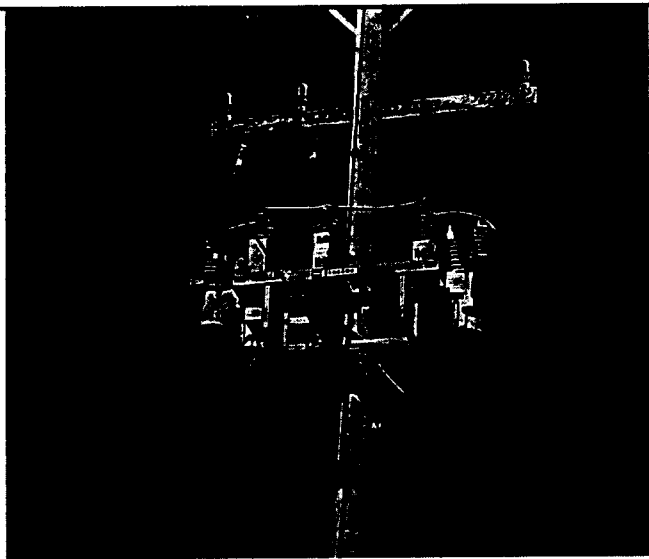
II. THERMOGRAPHIC EXCEPTION REPORT

6. WPSC ELECTRIC DISTRIBUTION SYSTEM

Stevens Point

<b>Report Number</b>	STP-5-00-09	<b>Date</b>	May 23, 2000	<b>Time</b>	12:44
----------------------	-------------	-------------	--------------	-------------	-------

<b>Component Description</b>	Oil switch
<b>Phases</b>	Field
<b>Location Number</b>	100AA48
7. <b>Address</b>	Hoover Ave.
8. <b>Photo Direction</b>	Northwest
<b>Comments</b>	Inspect/replace oil switch

<div data-bbox="123 1228 189 1543"> 135 - 132 - 128 - 123 - 119 - 114 - 109 - 104 - 97.6 - 91.1 - 83.9 - 75.8 - 66.4 - 55.4 - 41.6 - 23.2 - 2.8 - </div>  <div data-bbox="685 1123 817 1417"> <b>LAND</b>  Date : 05/23/00  Time : 12:44:16  Lens : Norm  Window : L 2  Dist : 0 Ft  T.Back : 74.8 °F  Emiss : 0.54  Atm. : 0.17 %  No T °F E </div>	
<b>Thermal Image</b>	<b>Visual Image</b>

Repairs Made:



Exhibit B

INFRARED SURVEY STATISTICS  
ANTIGO

DISTRIBUTION

SUBSTATIONS

YEAR	SURVEY MILES	SURVEY HOURS	IR FAULTS FOUND	SURVEY MILES / HOUR	IR FAULTS / SURVEY MILE	NUMBER OF SUBS SCANNED	TOTAL SCAN TIME (HRS)	IR FAULTS FOUND	IR FAULTS / SUB	SCAN TIME / SUB (HRS)
1990	43.00	2.75	3	15.64	0.07	1	0.25	0	0.00	0.25
1992 *	31.50	2.12	3	14.86	0.10	1	0.25	2	2.00	0.25
1994	19.60	2.13	10	9.20	0.51	1	0.58	0	0.00	0.58
1996 **	37.00	2.00	2	18.50	0.05	2	0.62	0	0.00	0.31
1998	35.70	1.98	0	18.03	0.00	2	0.30	0	0.00	0.15
<b>TOTAL</b>	<b>166.80</b>	<b>10.98</b>	<b>18</b>	<b>15.19</b>	<b>0.11</b>	<b>7</b>	<b>2.00</b>	<b>2</b>	<b>0.29</b>	<b>0.29</b>

CHILTON

DISTRIBUTION

SUBSTATIONS

YEAR	SURVEY MILES	SURVEY HOURS	IR FAULTS FOUND	SURVEY MILES / HOUR	IR FAULTS / SURVEY MILE	NUMBER OF SUBS SCANNED	TOTAL SCAN TIME (HRS)	IR FAULTS FOUND	IR FAULTS / SUB	SCAN TIME / SUB (HRS)
1991	96.00	4.50	0	21.33	0.00	3	1.00	0	0.00	0.33
1993*	85.10	4.42	6	19.25	0.07	3	0.83	5	1.67	0.28
1995	80.40	3.68	8	21.85	0.10	3	0.57	3	1.00	0.19
1997 **	90.70	3.60	6	25.19	0.07	6	0.72	3	0.50	0.12
<b>TOTAL</b>	<b>352.20</b>	<b>16.20</b>	<b>20</b>	<b>21.74</b>	<b>0.06</b>	<b>15</b>	<b>3.12</b>	<b>11</b>	<b>0.73</b>	<b>0.21</b>

Exhibit B (Continued)

INFRARED SURVEY STATISTICS  
EAGLE RIVER

DISTRIBUTION

SUBSTATIONS

YEAR	SURVEY MILES	SURVEY HOURS	IR FAULTS FOUND	SURVEY MILES / HOUR	IR FAULTS / SURVEY MILE	NUMBER OF SUBS SCANNED	TOTAL SCAN TIME (HRS)	IR FAULTS FOUND	IR FAULTS / SUB	SCAN TIME / SUB (HRS)
1990	62.00	2.75	0	22.55	0.00	2	1.00	0	0.00	0.50
1992*	47.70	2.32	2	20.56	0.04	2	0.20	0	0.00	0.10
1994	35.30	1.68	2	21.01	0.06	2	0.25	0	0.00	0.13
1996**	31.70	1.60	5	19.81	0.16	3	0.33	0	0.00	0.11
1998	29.30	1.42	3	20.63	0.10	4	0.50	0	0.00	0.13
TOTAL	206.00	9.77	12	21.08	0.06	13	2.28	0	0.00	0.18

GREEN BAY

DISTRIBUTION

SUBSTATIONS

YEAR	SURVEY MILES	SURVEY HOURS	IR FAULTS FOUND	SURVEY MILES / HOUR	IR FAULTS / SURVEY MILE	NUMBER OF SUBS SCANNED	TOTAL SCAN TIME (HRS)	IR FAULTS FOUND	IR FAULTS / SUB	SCAN TIME / SUB (HRS)
1991	187.00	14.00	3	13.36	0.02	21	2.00	5	0.24	0.10
1993*	145.60	9.35	6	15.57	0.04	21	1.53	1	0.05	0.07
1995**	134.20	7.87	18	17.05	0.13	18	3.45	14	0.78	0.19
1997**!	344.20	18.90	36	18.21	0.10	29	3.72	12	0.41	0.13
TOTAL	811.00	50.12	63	16.18	0.08	89	10.70	32	0.36	0.12

\* A NEW METHOD OF RECORDING TIME AND MILES FOR THE SCAN WAS STARTED IN 1992

\*\* DISTRIBUTION AND 13.8 KV WERE GROUPED THIS YEAR

! SWITCHING STATIONS WERE ALSO SCANNED THIS YEAR

## **VII. SERVICE CONDUCTOR INSPECTION**

### **INSPECTION**

The purpose of this process is to identify potential problems with electrical services to a premise. Meter reader are trained to inspect and report the following on services: bare conductors, bare connectors, low clearances over ground and buildings, conductors touching and customer code violations. Survey codes are entered into the meter readers' Itron handheld. This information is printed out to a report and provided to the district supervisor for follow up.

### **CONDITION RATING CRITERIA AND CORRECTIVE ACTION SCHEDULE.**

The location and type of service problems is provided to the district supervisor from a report generated by the meter reading department. Each district is responsible for establishing a priority to the items and taking corrective action within six months based on the severity of the violation. This process is supplemental to the WPSC PREP program.

### **RECORD KEEPING**

Records are electronically retained for 2 years and retained in the districts for a period of 10 years.

### **SUPPORTING DOCUMENTATION**

Exhibit A: Electric Operating Procedures No. D-2.50 Service Conductors Inspection

Exhibit A

WISCONSIN PUBLIC SERVICE CORPORATION		
ELECTRIC OPERATING PROCEDURES	DATE 01/21/85	NO. D-2.50
SECTION Line Maintenance	DEPT. Elec. Dist. Eng.	
PROCEDURE Service Conductors Inspection	PAGE 1 OF 1	

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A. Purpose

All service conductors should be inspected for safety on a periodic basis. This procedure provides the mechanism to assure that the inspections are done and that substandard conditions are corrected.

B. General

All electric services operating at 600 volts or below shall be covered with an insulating coating from the last pole to the customer's service entrance. The connections at the service entrance shall be taped or be of the insulating type. The insulation is intended to minimize the potential for accidental contact with our facilities by customers.

C. Inspection

All electric services shall be inspected on a periodic basis. The inspection program is made up of three parts.

1. The Meter Reader will inspect all services in the October meter reading cycle each year. The annual inspection will consist of looking for bare service conductors and service conductors that appear to have inadequate clearance. The information will be entered on the Porta Processor in the survey area. A daily report will be sent to the Operating Department listing services that need to be checked further.
2. Meter testers shall inspect all services as part of a standard meter test. An "X" shall be placed in survey box 1 on form 120-1244 if the service is bare or has inadequate clearance. A report is generated in the Information Services Department that summarizes the locations that have substandard service conditions.
3. Any employee should report any unsafe condition on the electric system. This report should be in the manner set by the District Supervisor.

D. Corrective Action

The District Supervisor shall take the appropriate action to correct all reported substandard service conditions. All substandard services shall be corrected within six months of the date they are reported.

## VIII. MISCELLANEOUS DISTRIBUTION LINE INSPECTIONS

### INSPECTION

Wisconsin Public Service has several general inspection efforts on its distribution system. These include simple things such as encouraging crews and other personnel to be on the look out for and turn in possible problems on the system. We also do routine items such as the following:

1. Take field OCR (oil circuit recloser) readings on a quarterly basis. This is kept track of by our "Distribution Unusual Occurrence Reporting System". This is used to find out if we are having problems. It is also used to determine when an OCR needs to be maintained. Our practice is to check an OCR in the shop every three years or every 100 operations, whichever occurs first.
2. The distribution departments do substation inspections every month. They are looking for any unusual potential problems in the substation. They also do things such as: check the counters on all breakers, record load data information if appropriate (the newer facilities are going to all electronic information captured via SCADA) and check the operation of the voltage regulators or load tap changers (involves recording the counter readings, checking operation, and taking a voltage reading.)
3. Any time that we have a disturbance involving a substation with SCADA, we inspect the substation, update the counters, and reset the relay targets. All of this information is recorded.
4. Field voltage regulators are inspected every month. The counter reading is taken, a simple operations check is made, and a voltage reading is taken. As needed or at least once a year, each regulator is checked by an engineer or technician. If voltage problems are detected by line crews, electric meter technicians or by customer calls, an engineer or technician is sent immediately to check out the voltage regulator for possible problems.
5. The Regional Engineers or a technician sets up field capacitors. These are inspected on at least an annual basis for proper operation. It is easy to know that there are problems on the system based on instantaneous data from the SCADA system or end of month graphs showing kW, kVAr, and power factor by feeder. The general criteria are to place the capacitors near the load (using computer-aided modeling). The capacitors are operated to keep the distribution system around 98% lagging on peak. There are exceptions to this based on local transmission problems. As an example, the Upper Western area is operated at 98% leading.

### CONDITION RATING CRITERIA and CORECTIVE ACTION SCHEDULE

The above programs are either general inspection programs or general maintenance items. The work is done right away in most cases. The exception would be the keeping track of the operation of voltage regulators. If it is noticed that a voltage regulator has excessive operations, an engineer or technician is sent out to make adjustments. Also the counter readings are used to determine when the regulator should be removed for servicing. We have various criteria based on experience, load on the regulator, and if it is a substation or field unit.

## RECORD KEEPING

There are extensive records on the substation inspections and field regulator inspections.

## IX. TRANSMISSION LINE INSPECTIONS

A. Transmission Line Inspections - Transmission inspectors under the direction of the Supervisor - Substation & Transmission Construction & Maintenance shall make transmission inspections.

1. Annual Inspections - A complete inspection of each transmission line will be made once a year. The Supervisor - Substation & Transmission Construction & Maintenance will inform local supervisors of repairs found necessary.
2. Groundline Inspections - A groundline examination shall be made of each transmission pole and guy stub at the time it reaches the age of 20 years, and from this examination, subsequent re-examinations shall be established. Continuous records of these pole examinations shall be kept and from this data, the pole replacement and treatment program shall be set up from year to year (for pole treating, see page 5). Anchor rods, guys, and steel and concrete tower footings shall be included in the above periodic examinations and records.

B. Line Inspections

1. Scheduled Inspections - Transmission lines shall be inspected in accordance with the following schedule and shall include all branches not isolated by automatic devices.

Month	J	F	M	A	M	J	J	A	S	O	N	D
-------	---	---	---	---	---	---	---	---	---	---	---	---

All Lines	-	-	-	-	x	-	-	x	-	-	-	x
-----------	---	---	---	---	---	---	---	---	---	---	---	---

Scheduled inspections will be made by helicopter under the direction of the Supervisor - Substation & Transmission Construction & Maintenance except for line sections where inspections by flying is not advisable. The Supervisor - Substation & Transmission Construction & Maintenance will designate these sections and will inform the local managers or electric supervisors where walking inspections will be made.

For special inspections, see page 4.

2. Transmission Line Inspection Report - A report shall be made of every inspection, scheduled or special, by the person who actually performs the inspection. His findings are to be recorded on the "Transmission Line Inspection Report" (see attachment).

3. Inspection Instructions - Line inspections will cover information on the following:
- a. Overhead Conductors and Devices
    - (1) Broken, chipped, flashed, or noisy insulators and whether or not in need of prompt replacement.
    - (2) Damaged conductors or unstranding of conductors. (Include shield wires).
    - (3) Damaged armor rods, tie wires, strain and suspension clamps.
    - (4) Damaged lightning protector tubes.
    - (5) Inadequate clearances and improper sag.
    - (6) All shield wires are bonded.
  - b. Poles, Towers & Fixtures
    - (1) Missing nuts or hardware and loose hardware.
    - (2) Damaged, broken, or split crossarms.
    - (3) Damaged, broken, or split braces.
    - (4) Damaged poles (include guy stubs).
    - (5) Leaning poles (include guy stubs).
    - (6) Broken, loose, or missing grounding wires for grounding overhead shield wires.
    - (7) Damaged or broken stub reinforcements.
    - (8) Pole berms in need of repair.
    - (9) Missing numbers on poles.
    - (10) Missing or illegible warning signs on poles.
    - (11) Foreign objects attached to poles (signs, fences, etc.)
    - (12) Broken, deteriorated, heaving or eroded concrete tower footings.
    - (13) Rusting, heaving, or eroded steel tower footings.
    - (14) Record all conductor sleeves on aluminum lines only.
  - c. Guys and Anchors
    - (1) Slack, broken, or rusting guys.
    - (2) Broken or damaged guy strain insulators.
    - (3) Rusting or buried anchor rods.
    - (4) Anchors pulling out or heaving.
    - (5) Damaged or missing guy guards.
  - d. General
    - (1) Any improper condition of special structures, switches, cable terminals or other equipment.
    - (2) Any new roads or railroads built or being built under transmission lines.
    - (3) Any new buildings built or being built under or near, either vertically or horizontally, transmission line conductors.
    - (4) Any new power or telephone lines crossing under or over transmission lines. Measure clearance with measuring stick.



- (5) Any TV or radio antenna within falling distance of the line, without the necessary safety wire attached to the top of the antenna and secured in a direction away from the power line.
    - (6) Any sign of unusual activity, such as parties, recreational vehicles, children playing, etc.
  - e. Right-of-way
    - (1) Condition of right-of-way, such as woods, brush, etc. interfering with patrol and line maintenance.
    - (2) Insufficient tree clearances. Report whether or not prompt attention is required.
    - (3) Dead or dying trees or branches which would endanger the line in falling.
    - (4) Check for danger trees off the right-of-way.
- A. Special Inspections - After any transmission line fault which causes an extended outage and after established switching procedures have been carried out isolating such fault, a special inspection shall be made to locate the trouble and determine the extent of repairs necessary. It is the responsibility of the Substation & Transmission Operations Group and the local supervisors in charge of maintaining the section in trouble to order out inspections and to inform System Operating of the findings. The local supervisor shall be responsible for coordinating ground inspections with local forces. The Substation & Transmission Operations Group will order out and perform any aerial inspections as may be deemed necessary. It is important to maintain close communications between the respective groups to coordinate repair efforts properly and effectively.

If the outage is momentary, System Operating shall notify Substation & Transmission Operations and a joint decision shall be made as to whether or not an inspection is necessary. If local forces are used to perform an inspection, all findings shall be reported on the "Transmission Line Inspection Report". For scheduled inspections, see page 1.
- B. Transmission Line Repairs - Electric departments shall supervise and perform transmission line repairs.
  - 1. Emergency Repairs - Necessary emergency repairs reported by helicopter or special inspections shall be taken care of immediately. During such repairs, close cooperation is to be maintained with System Operating. Should help be required for emergency repairs, Section D-1.20 of the Electric Operating Procedures is to be followed.
  - 2. Regular Repairs - Necessary transmission repairs which come to the attention of local supervisors by means of the Transmission Line Inspection Report or by request of the Supervisor - Substation & Transmission Construction & Maintenance shall be completed before the next scheduled inspection unless there

is reasonable cause for delay. Should outside help be required, a request shall be made to the Division Manager for assistance.

3. Transmission Line Maintenance Work - All repair work that is done by local forces on transmission lines is to be reported to the Supervisor - Substation & Transmission Construction & Maintenance on the "Transmission Line Inspection Report" (see attached). Repairs made because of items listed on helicopter inspection, special inspection, or annual inspection reports should be reported to the Supervisor - Substation & Transmission Construction & Maintenance by filling in the "DATE REPAIRED" column of the report sheet and returning that sheet to the Supervisor - Substation & Transmission Construction & Maintenance.

C. Transmission Right-of-Way Maintenance

1. Right-of-way Clearing - Clearing of transmission rights-of-way shall be under the direct supervision of the Supervisor - Substation & Transmission Construction & Maintenance who shall maintain a systematic program by which rights-of-way shall be kept clear of high growing vegetation.

The transmission right-of-way clearing program will be coordinated with the distribution right-of-way clearing program when and where practical through a series of regularly scheduled meetings each year.

2. Clearing of Lines Having Distribution Underbuild - Once a year these lines will be reviewed jointly by the Transmission and Distribution Groups. The cost of the work will be budgeted separately. The work will be done by contractors under local district supervision.

- D. Transmission Pole and Tower Maintenance - Preservative treatment of transmission poles shall be under the direct supervision of the Supervisor - Substation & Transmission Construction & Maintenance who shall maintain a systematic program of preservative treatment by which the life of poles may be extended most economically. Painting of steel poles and towers and maintenance of steel and concrete tower footings will also be under the direct supervision of the Supervisor - Substation & Transmission Construction & Maintenance.

TRANSMISSION LINE INSPECTION REPORT

TO

COPY TO File

LOCATION

HELICOPTER PATROL

LINE

SPECIAL PATROL ✓

SECTION INSPECTED

ANNUAL INSPECTION

INSPECTED BY

DATE

STR. NO.	REPAIRS REQUIRED	DATE REPAIRED

SIGNED R. J. Enders

## **X. SUMMARY**

The preceding information describes the processes presently in place at WPSC for the preventative maintenance of the electric distribution system. There are several changes underway that will affect these processes, for example the completion of the first PREP cycle and Automated Meter Reading. WPSC is committed to reliability and excellent customer service through proper operation and maintenance of the electric distribution system. Through process improvement efforts, several of these procedures will be modified and combined. The changes will be documented in future filings of the WPSC Preventative Maintenance Plan.

Although the Supporting Documentation contains statistics and schedules for some of the processes, this is not intended to be a periodic performance report. A separate report will be provided prior to May 1, 2001, to update the Commission on the status of each of these processes for the year of 2000.

**Wisconsin Public Service Corporation  
Preventative Maintenance Plan –  
Substation**

- I. INTRODUCTION**
- II. SUBSTATION INSPECTION FORM GUIDE**
- III. BEST WORK STEPS**
- IV. SUBSTATION INSPECTION REPORT**
- V. PREVENTATIVE MAINTENANCE WORK ORDER GENERATION**

## **I. INTRODUCTION**

### **CORRECTIVE ACTION:**

Computerized maintenance management software (CMMS) is utilized to schedule and track corrective maintenance items. When corrective maintenance is required on a piece of equipment, a work request is generated. Work requests may be generated by substation, distribution, or generation personnel. Work requests are reviewed by the CMMS Coordinator and/or the Manager of Substation Operations and upon approval become work orders. Work orders are prioritized based on a rating system. Each substation asset is assigned a criticality code (i.e. will cause multiple transmission line or transmission transformer outage, will cause outage to load of less than 10MVA, will not cause an outage, etc.) and an associated numeric value based on the affect on the transmission system if the asset is out-of-service. Each asset is also assigned a status code (i.e. failed, operating normally, will fail) and an associated numeric value based on the status of the asset when the corrective action is reported. A calculation is performed to determine the work order priority. High priority work orders are given preference over lower priority work.

Budgets are prepared for a three year time frame (i.e. budgets for 2001, 2002, 2003 are prepared during the summer of 2000). Large individual expenditures and known annual activities are identified in the budget. Funds are also budgeted for general repairs and maintenance based on the results of inspections, results of preventative maintenance programs, and historic expenditure levels. Prior to planned outages, a work plan is prepared detailing the scope of work including manhours needed and expected expenditures. If expenditures exceed the amount budgeted, the scope of work is reviewed and prioritized taking into consideration safety, production, potential increase in outages, etc. If the scope of work can not be reduced by reprioritizing or rescheduling, the work will be performed as required. To satisfy budget requirements, funds from other lower priority areas may be transferred or a budget overrun may occur.

### **RECORD KEEPING:**

CMMS is used to create, schedule, track, and record corrective maintenance and repetitive preventative maintenance tasks. The software contains the criticality logic that is used to prioritize corrective maintenance work. All work orders and work related documentation including work description, duration of work, date scheduled vs. date completed, and parts used are included within CMMS. Inspection and repair records will be retained for the life of each substation within the CMMS database.

## II. SUBSTATION INSPECTION FORM GUIDE

### OVERVIEW

<b>WHAT'S COVERED</b>	✓ A step-by-step guide for completing a Substation Inspection Report.
<b>WHY</b>	✓ To ensure that substations are inspected properly.
<b>KEY POINTS</b>	✓ Substation should be inspected thoroughly on a routine basis.
<b>UNIQUE SAFETY CONSIDERATIONS</b>	✓ Follow all appropriate WPSC Safety Rules.
	✓ When inspecting in breaker control cabinet, keep fingers and hands clear of operating mechanism.
	✓ If any unusual noise is encountered, investigate from a safe distance, stay clear and contact S&T Operations.
<b>SPECIAL EQUIPMENT</b>	✓ Spotting Scope or Binoculars
	✓ Substation Inspection Report Forms
<b>NOTES</b>	✓ If a defect is noted, please make comprehensive notes in the remarks section.
	✓ Binoculars or a spotting scope allows for closer inspection of substation equipment at a safe distance.

### **III. BEST WORK STEPS**

**Check in with System Operating upon entering the substation.**

**Place a check mark on the Inspection Report form for each inspection completed.**

**Record defects and item number in remarks block.**

**Enter the Inspection date in the Station Log Book.**

**Follow-up maintenance is based on needs and time availability.**

**Defects that put the system or equipment in jeopardy are repaired immediately.**

**NOTE: This is an inspection, notify S&T Operations for significant maintenance.**

#### **CONTROL HOUSE:**

1. Building, Appearance, Inside/Outside
  - Observe signs of water leaks
  - Observe signs of mice
    - In Main Terminal Cabinet
    - In Control Cable Tray
  - Indicate if floors need scrubbing or painting
  - Note that Substation Inspection Report form and System Disturbance Report forms are present
  - Observe for wasp nests
  - Record obvious repairs needed including cable entrance sheds
  - Sweep the floor
  - Empty the waste basket
2. Heat, Ventilators, Air Conditioning, Temperature
  - Check that the Control House temperature is normal
    - Thermostats are set at 65 for heating, 75 for cooling
3. Battery, Rack & Area
  - Observe for signs of battery cell electrolyte leak
  - Indicate if battery terminals are corroded
  - Indicate if corrosion is on walls or floor
  - Check the Eye Wash Station solution for expiration date
  - Observe that Warning Signs are present
4. Switchboard Lights
  - Appropriate lamps are lit (Red-Closed, Green-Open, White-Hot Line Indication)
  - Replace lamps as needed
  - Immediately notify S&T Operations if replacement lamps will not light
5. Spare Switchboard Fuses and Lights
  - Verify that the fuse and lens puller tools are present
  - Verify that there are spare lamps in file cabinet
  - Verify that there are spare fuses in file cabinet



- Verify that Protective Cards are present
- Ensure replacements are ordered from S&T Operations
- 6. Relay Targets, Record Under Remarks, Reset Targets
  - Report both relay targets and annunciator alarms to System Operating Office
- 7. AC & DC Lights
  - Verify that all lights work, indoor and outdoor
  - Get familiar with location of lighting switches
  - Verify that the DC emergency light works
- 8. Door Operation (Including Panic Hardware)
  - Verify that Emergency Exit door (panic door) operates normally
  - Verify that Entrance door operates normally
  - Verify that the door stop is operable
  - Verify that the door locks are operable
  - Observe that the EXIT signs are on inside of doors
- 9. Telephone
  - Are local emergency numbers posted and correct?
  - Are indoor and outdoor ringers operable (have local center call back)?
  - Is substation address and fire number present?

#### **BUS WORK, SWITCHES:**

- 10. S&C Circuit Switchers/Interrupters
  - Observe the circuit switcher position. If closed, then blades should be flat in jaw.
  - Observe for low gas indication target of interrupter bottle. If a target is present, notify System Operating immediately
  - Observe condition of control cabinet (i.e., water leaks, door gasket, etc.)
- 11. Switch Motor Operators
  - Verify that operating swing handle or crank is present
  - Are heaters ON? (should remain on all year)
  - Observe door seal condition
  - Observe that the de-coupling instructions are in the Substation Operating Procedure Book
- 12. Switches
  - Observe switches are closed correctly
  - Observe switch insulators for damage
  - Observe that conductors from the switch to equipment are not excessively tight
  - Observe that switch attachments are in proper operating position (i.e., whips, interrupters, etc.)

13. Switch Locks and Signs
  - Are switch locks present and serviceable?
  - Are switch signs present and legible?
  - Note that closed switches are not locked
  - Does grade need to be raised at switch operating mechanism locations to avoid standing in water or on ice when operating a switch?
14. Insulators (Bus Support)
  - Visually inspect insulators for flash marks, cracks, chips

**CAUTION: Maintain working clearances**
15. Arresters, Current and Potential Transformers
  - Observe bushings for flash marks, cracks, chips
  - Observe CT & PT bushing for oil leaks and oil levels
  - Observe condition of junction boxes (i.e., water leaks, door gaskets, etc.)
  - Observe condition of fuses
  - Are ID tags present and legible?
16. Potheads, Power Cables
  - Observe for signs of dielectric compound leakage
  - Visually inspect terminations for excessive tension
  - Visually inspect terminators for weather checking
17. Leads and Connections
  - Observe all leads for excessive tension and electrical clearance
  - Observe for broken wire strands
  - Observe all connector bolts are present
  - Observe expansion joints for binding or over-extension

#### **FENCE, GROUNDS, STRUCTURES:**

18. Buildings Other Than The Control House
  - Observe for signs of water leaks
  - Observe for signs of rodents
    - In Main Terminal Cabinet
    - In Control Cable Tray
  - Indicate if floors need scrubbing or painting
  - Record obvious repairs needed including cable entrance sheds
  - Sweep the floor
  - Empty the waste basket
  - Observe for wasp nests
19. Fence, Gates, Locks, Signs
  - Check that barbed wire is intact

- Are “High Voltage” or “Warning High Voltage” signs present on fence and gates (minimum 60 ft. Intervals)?
- Do entrance gates operate properly?
- Is the yard grade within 4” of fence fabric?
- Are fence grounds intact, including gate grounds?
- Are locks working properly?

20. Washouts, Weeds

- Determine if a washout is a safety hazard (fill in or barricade)
- Note over abundance of weeds (June through September)

21. Landscaping and Shrubs

- Check for dead or dying trees or shrubs
- Pick up trash in and around substation including outside of fence and driveway

22. Erosion, Driveway and Site

- Fill in or barricade, as needed

23. Driveway Culverts

- Ensure that culverts are open
- Remove debris from culvert

24. Foundations

- Observe for cracks
- Observe for rotting concrete

25. Yard Lights and Light Standards

- Observe the condition of the light standards
- Observe concrete light standards for cracking
- Do the yard lights need adjustment?

26. Ground Wires

- Verify that the structure and equipment grounds are intact
- Note ground grid wire or ground rods protruding from gravel, and barricade tripping hazards

27. Conduit and Fittings, Secondary Junction Boxes

- Are conduit fitting covers are present?
- Open yard secondary junction boxes and inspect for water leakage
- Are conduit straps in place?
- Is there rust present?
- Are ID tags present legible?

28. Underground Cable

- Observe outdoor equipment control cabinet and cable entrances for excessive control cable tension

29. Paint

- Observe equipment and structure for rust and areas that need touch up painting

30. Lightning Mast

- Are masts securely grounded?
- Do the masts appear plumb?

31. Oil Leaks

- Indicate oil leak area
- Contact S&T if the oil leak is serious
  - Serious = wet and puddled
  - Minor = dry to slightly wet

**ACCESSORIES:**

32. Cabinets, Junction Boxes, ID Tags

- Are cabinet and junction box ID tags present and legible?
- Observe all control cabinets and junction boxes for signs of water leakage
- Observe the condition of door gaskets

33. Switch Sticks & Storage Boxes

- Observe the condition of switch sticks
- Observe the condition of the switch stick storage device
- Observe box for signs of water leakage

34. Feeder Metering Panels

- Are ID tags present and legible?
  - Feeder ID
  - Phase ID
  - Meter Socket ID

**TRANSFORMERS, POTENTIAL TRANSFORMERS**

**Indicate Transformer Bank Number, HV Number, P Number**

35. Main Tank Pressure (+, -, 0)

- Normal pressure is 0.5 to 5 lbs. PSI (positive)
- Note pressure if out of range
- Immediately report negative pressure to S&T Operations
- Identify the sudden pressure device and check for a target flag
- Do not operate (reset) the sudden pressure reset switch in the control cabinet

36. Nitrogen Tank Pressure

- Note nitrogen tank pressure
- Immediately contact S&T Operations if below 200 PSI
- Observe condition of cabinet

37. Fans, Pumps

- Indicate if fans and pumps are running
- Fan and pump controls are normally in “Automatic” position
- Remove bird nests and debris from cooling fans
- Observe condition of control cabinet
- Test operate fans and pumps during spring inspection
- Are heaters ON?

38. Temperature – Transformer Oil

- Indicate top oil temperature
- Indicate temperature gauge drag hand position
- Reset drag hands if above 70°C
- FYI –
  - Formulas:
    - Celsius to Fahrenheit =  $(\text{Celsius} \times 9/5) + 32$
    - Fahrenheit to Celsius =  $(\text{Fahrenheit} - 32) \times 5/9$
- Verify that fans and pumps control are in the “Auto” position

NOTE: Immediately contact S&T Operations if transformer is excessively hot and/or cooling system is not operating as indicated.

NOTE: Cooling systems operate automatically under the following conditions.

- Top oil temperature gauge settings
  - 1<sup>st</sup> stage fans operate @ 60°C
  - 2<sup>nd</sup> stage fans and pumps operate @ 65°C
  - Alarm operates @ 90°C
- Winding temperature gauge settings
  - 1<sup>st</sup> stage fans operate @ 70°C
  - 2<sup>nd</sup> stage fans and pumps operate @ 75°C
  - Alarm operates @ 115°C

39. Oil Level

- Indicate if oil level is low
- Oil level is normally higher in summer and lower in winter
- Indicate if control cabinet has oil or water leak

40. Gauges

- Indicate if broken or damaged
- Indicate drag hand position

- Reset drag hands if 70°C or higher

41. Oil Leaks

- Indicate oil leak area
- Contact S&T Operations if Serious
  - Serious = wet and puddled
  - Minor = dry to slightly wet

42. Bushings

**CAUTION: Maintain working clearances**

- Observe bushing oil level, indicate if low
- Visually inspect the condition of bushings
  - Cracks or chips in porcelain
  - Contamination on porcelain
  - Flash marks
  - Oil Leaks

43. Paint

- Indicate if paint is chipping, peeling, rusting on tank, radiators, etc.

44. Foundations

- Observe concrete for deterioration, cracks, out of plumb

**OCB, VCB, OCR, GCB**

**Indicate “B” number, Line or Feeder designation**

45. Normal Oil, Gas, or Air Pressure

- Normal operating pressure is indicated on the gauge or cabinet door
- Indicate the gauge pressures if out of range
- Verify that “Open” and “Close” position indicators are present and legible
- Listen for audible air leaks on air operators

46. Operation Counter Reading

- Record operation counter reading
- Update the counter card, if needed

47. Heaters

- Indicate that heaters are operating normally.
- Ensure heater switches are “On”.

48. Cabinet Interior

- Indicate if cabinet needs attention (cleaning or repair)
- Observe for oil, air, or water leaks

49. Bushings

- Observe bushing oil level, gauge or glass globe
- Indicate if oil level is low
- Contact S&T Operations if oil level is off scale (low or high)

50. Paint

- Indicate if paint is chipping or peeling

51. Foundations

- Observe concrete for deterioration, cracks, out of plumb

52. Compressor Hour Reading

- Indicate compressor hour reading
- Update the compressor hour operation card if the “run time” is significantly different (more than 10 hours).

53. Oil Level/Leaks

- Observe tank oil level gauge, indicate if low
- Indicate location of oil leak
- Temperature of the oil tank should be ambient temperature
- Immediately contact S&T Operations if the tank is hot

## **VOLTAGE REGULATORS**

### **Indicate “R” Number and Line/Feeder Number**

54. Control

- Observe condition of the control cabinet (i.e., water leaks, door gasket, etc.)

55. Temperature

- Indicate if hot (feel with hand)
- Contact S&T Operations if excessively hot

56. Oil Leaks

- Indicate oil leak area
- Contact S&T Operations if Serious
  - Serious = wet and puddled
  - Minor = dry to slightly wet

57. Paint

- Indicate if paint is chipping or peeling

58. Foundations

- Observe concrete for deterioration, cracks, out of plumb

59. Oil Level

- Observe oil level in oil level gauge

**CAPACITOR BANK**



60. Observe for blown capacitor fuses

- Immediately notify S&T Operations if a fuse is blown
- Indicate if fuse leads are frayed or have loose strands
- Indicate if fuse holders are excessively weather worn

61. Observe for bulged or leaking capacitors

- Indicate if units are bulged
- Note any indication of oil leak
  - Minor = Dry spot
  - Serious = Wet spot or dripping oil

62. Observe condition of Danger Signs

- Verify that Danger HV signs are present on all four sides of each phase structure



**Substation Inspection Report Guide**  
**Best Practice Development:**

**Crew Representatives:**

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Linda Lotter, WAU  
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**Issued by:**

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**Put in FINAL:**

April 6, 2000

**Put in Practice:**

October 20, 2000

**Revised:**

December 20, 2000

# IV. Substation Inspection Report

## SUBSTATION INSPECTION REPORT

Station \_\_\_\_\_  
Date \_\_\_\_\_ Time \_\_\_\_\_ Temp \_\_\_\_\_  
To: S&T Operations Supvr. ☐ Ashw. ☐ Wausau  
Inspector: \_\_\_\_\_

SS9-26.1

<b>Control House</b>		✓	<b>Fence, Grounds, Structures</b>		✓
1	Building, Appearance, Inside/Outside		18	Buildings	
2	Heat, Ventilators, Air Cond., Temperature		19	Fence, Gates, Locks, Signs	
3	Battery, Rack & Area		20	Washouts, Weeds	
4	Switchboard Lites		21	Landscaping & Shrubs, Trees, Grass	
5	Spares Swbd. Fuses & Lites		22	Erosion - Driveway & Site	
6	Relay Targets - Record under Remarks, Reset		23	Driveways, Culverts	
7	A.C. & D.C. Lights		24	Foundations	
8	Door Operation (Inc. Panic Hdw.)		25	Yard Lites & Posts - Test Lights	
9	Telephone - Check Ringer (Indoor & Outdoor) Correct Phone Numbers		26	Ground Wires	
<b>Bus Work, Switches</b>			27	Conduit & Fittings	
10	S&C Circuit Switches, Circuit Interrupters-Gas-Target		28	Underground Cable	
11	Switch Motor Operators		29	Paint	
12	Switches - Contacts Fully Closed		30	Lightning Mast	
13	Switch Locks & Signs		31	Oil Leaks - Explain in Remarks	
14	Insulators, Bus Supports		<b>Accessories</b>		
15	Arrestors, Current & Potential Transf.		32	Cabinets & Boxes, ID Tags	
16	Potheads, Cables		33	Switch Sticks & Boxes	
17	Leads & Connections		34	Feeder Metering Panels - ID Tags	
<b>Transformers, Potential Transformers</b>					
	HV #/P #				
	Bank #				
35	Maintank Pressure (+, -, 0)				
36	Nitrogen Tank Pressure - Lbs. (Turn off if below 200 lbs.)				
37	Fans, Pumps (X if on)				
38	Temperature (Reset if over 70) Note Drag Hand Indication				
39	Oil Level (X if on)				
40	Gauges (X if broken)				
41	Oil Leaks - (S-Serious, M-Minor)				
42	Bushings - Oil Level (X if low) - Defective (X)				
43	Paint				
44	Foundations				
<b>OCB, VCB, OCR, GCB</b>					
	B #				
	Line/FDR				
45	Operator, Oil or Air Pressure - Lbs. Gas				
46	Operation Counter Rdg. (Update Card)				
47	Heaters (On-Off)				
48	Cabinet Interior (X needs attention)				
49	Bushings - Oil Level (X if low) - Defective (X)				
50	Paint				
51	Foundations				
52	Compressor Hour Rdg. (Record Hours)				
53	Oil Level/Leaks				
<b>Voltage Regulators</b>					
	R #				
	Line/FDR				
54	Control (X if defective)				
55	Temperature (X if hot)				
56	Oil Leaks (S-Serious, M-Minor)				
57	Paint				
58	Foundations				
59	Oil Level				
<b>Capacitor Bank</b>					
	Bank #				
	Unit #				
60	Blown Fuses				
61	Bulged or Leaking Cans				
62	Warning Signs				

- over -

To complete a proper substation inspection, refer to the Substation Inspection Form Guide, BWP-1303, located in the Substation Operating Procedures book on site.

[illegible]

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January 15, 2001

## V. Preventative Maintenance Work Order Generation

### Work Order Generation

Must specify asset position and component information on generated PM work order.  
CMMS Coordinator.

### PM Schedules

Schedules may represent multiple schedule lines per craft. Can use this to establish schedules based upon the following:

- runtime days between overhauls (Runtime)
- operations since last overhaul (meter reading)
- multi-annual (every 5 or 10 years)

### Generic Preventative Maintenance Schedule Cycles

The following is a list of standard preventative maintenance intervals, which will be applied to the generic PM procedures in established EMPAC.

Rod Ellifson, Jeff Blume, Paul Schleis and Carrol Clements have developed this list.

Fuses	Inspection	3 yr	Test S&C's SMD style
Station Battery			
	Inspection	1 yr	Staggered with Battery Test
	Test	1 yr	Staggered with Battery Inspection
	Maintenance	1 yr	To be driven by Test or Inspection
Battery Charger			
	Inspection	1 yr	Normally with Battery Test
Power Transformers			
	Test	5 yr	Transmission
		10 yr	Distribution
			P.F. Transformer, Bushings, & Oil
Temperature Devices		---	Same schedule as Power Transformers

Oil Quality	1 yr or 2 yr	West is on a three-year cycle
GIO (Dissolved Gas)	3 mo	Nuclear GSU
	6 mo	Fossil GSU, 345 kv and plant auxilliary
	1 yr	138kv, 115kv, 69kv-46kv,
	2 yr	69kv-24.9kv, 46kv-24.9kv
ULTC's      Overhaul	Operations	150,000
Breakers		
ACB's, GCB's, OCB's, VCB's		
Inspections	1 yr	Winterizing
Test	6 yr	Speed, Microhm, & P.F.
Overhaul	12 yr	Based on tests
	Operations	30 Fault
Reclosures		
OCR's, VCR's		
Inspection	1 yr	Winterizing
Overhaul	6 yr	Only if oil has water in it. (Dennis Johnson)
	Operations	50 Fault
		Microhm Contacts
		Vacuum Bottle Test on VCR's
Circuit Switchers		
Inspection	5 yr	Capacitor Bank
	10 yr	Others
	Operations	Series 2000
Switches (MOD's)	1 yr	Auto Tests
PT's	10 yr	P.F. Ratio, GIO
CT's	10 yr	P.F. Ratio, GIO
Arrestors	5 yr	On Transmission Transformers
	10 yr	On Bus or Distribution Transformers
Capacitor Bks.		
Test	5 yr	
Coup. Cap/Wave Trap	? yr	(Need a Schedule)
Voltage Regulators		
Overhaul	By Mfr.	Type and Tap Changr Count
	Operations	A.C. & Siemens TLG=50K

TLF=75K (100K, East)  
 G.E. 100K  
 Cooper 50K

Investigation		Operations	by Month (>2000)
AutoTests		1 yr	
Thermotrace		1 yr	
Substations	Inspections	Monthly 1 yr	Field Personnel, Lineman, etc. Substation Personnel
Switch Sticks	Inspection	1 yr	
Insulators	Testing	5 yr	
Sirens (G.B.)	Maintenance	1 yr	
Radio	Calibrate	1 yr	

